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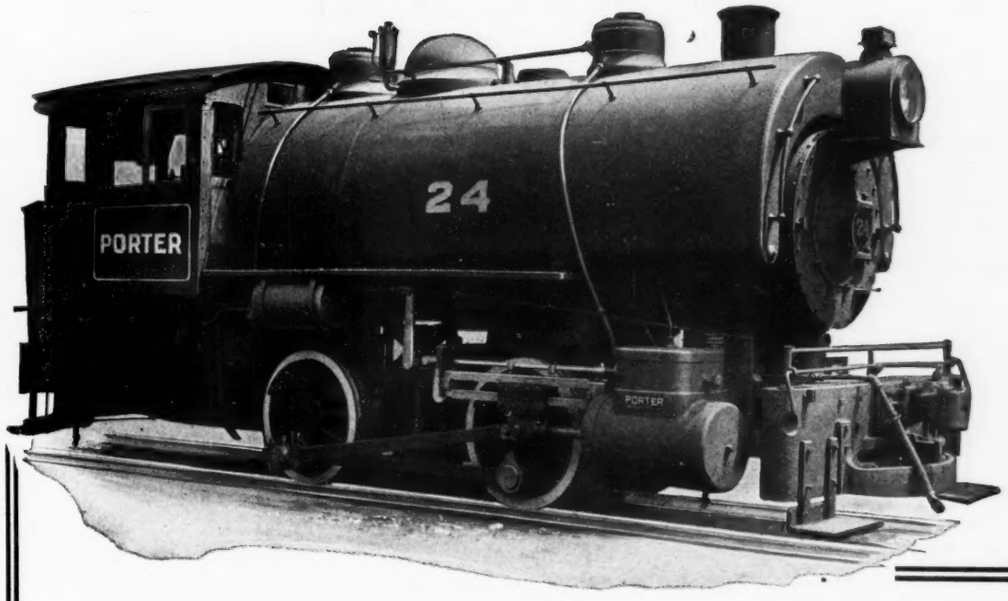

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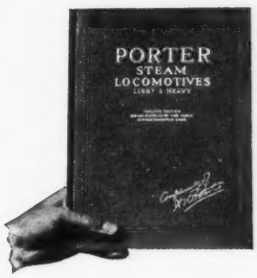

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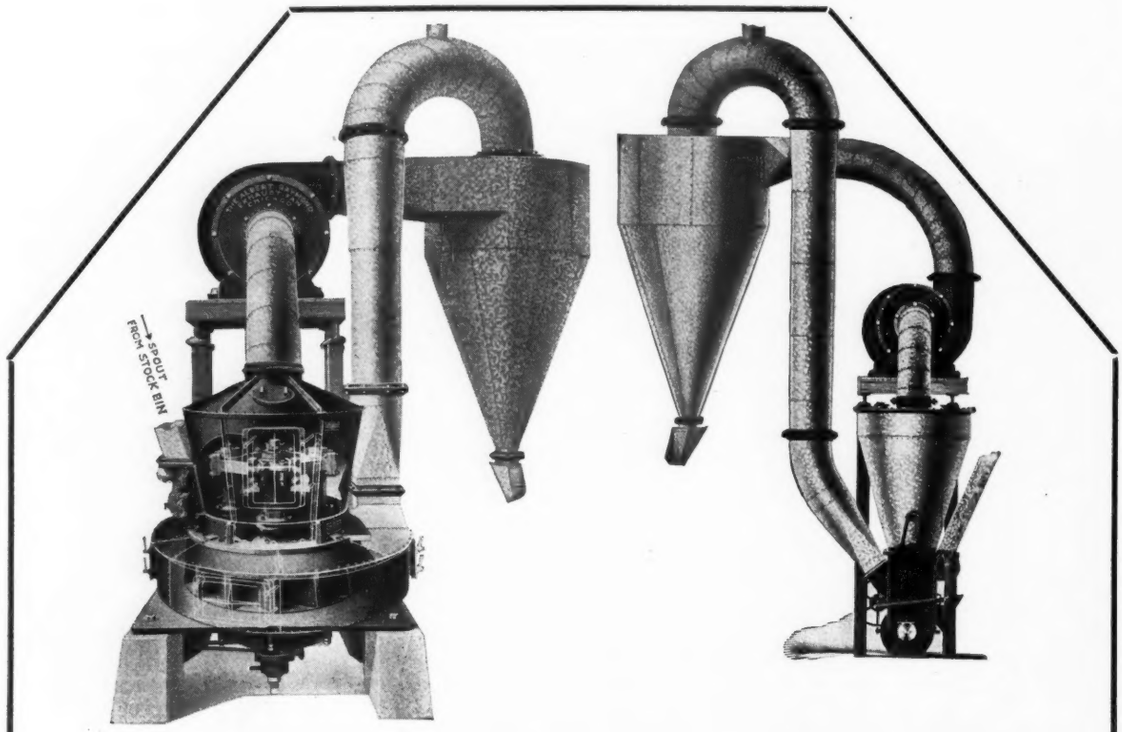

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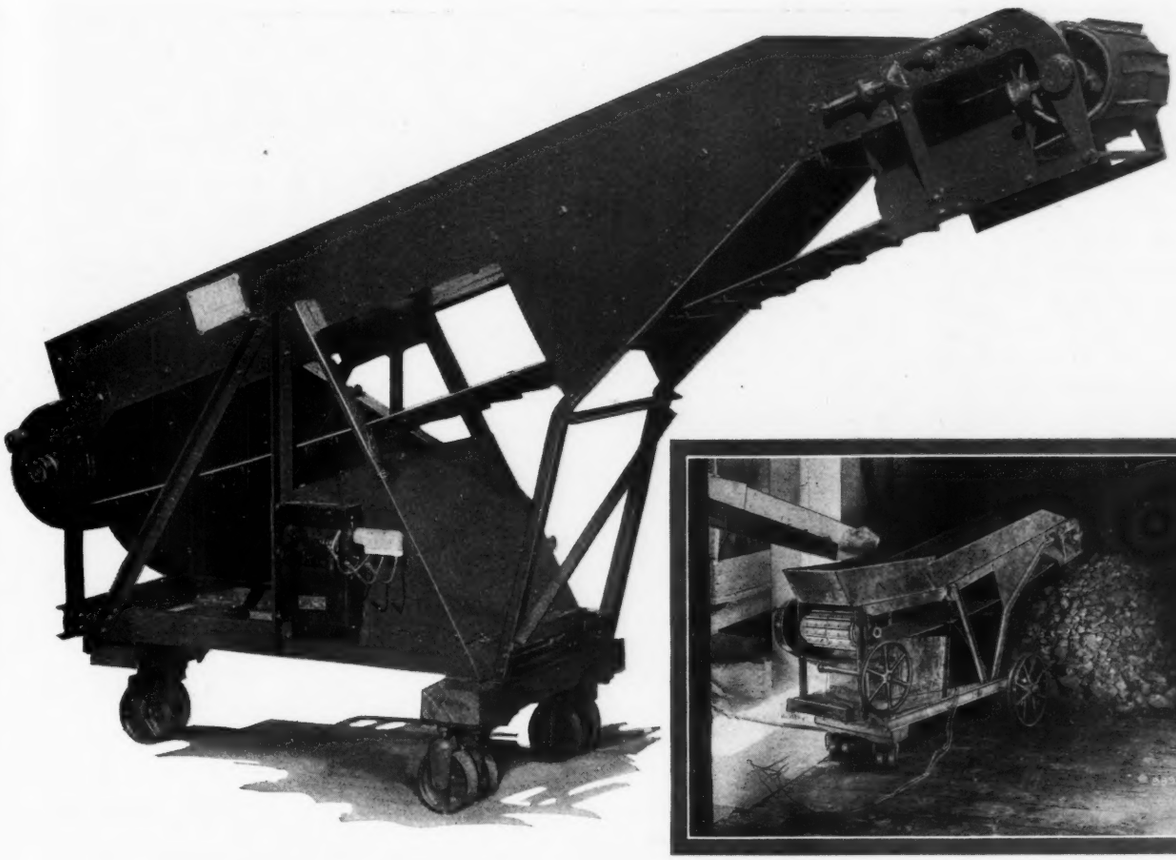

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Send for our illustrated catalog. It shows many phases of haulage—underground and surface. This locomotive works anywhere tracks can be laid.

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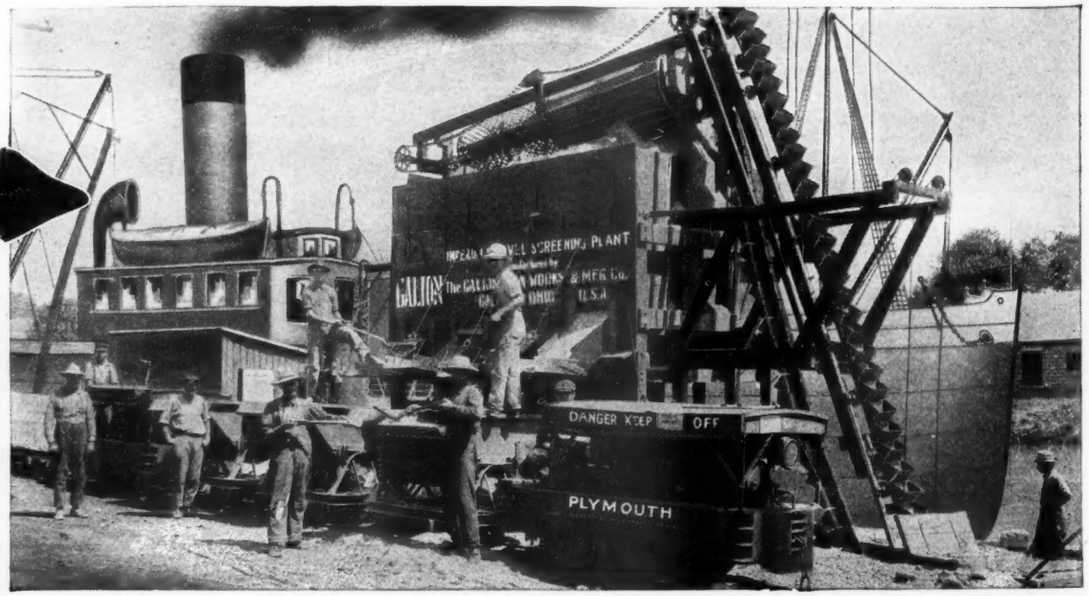

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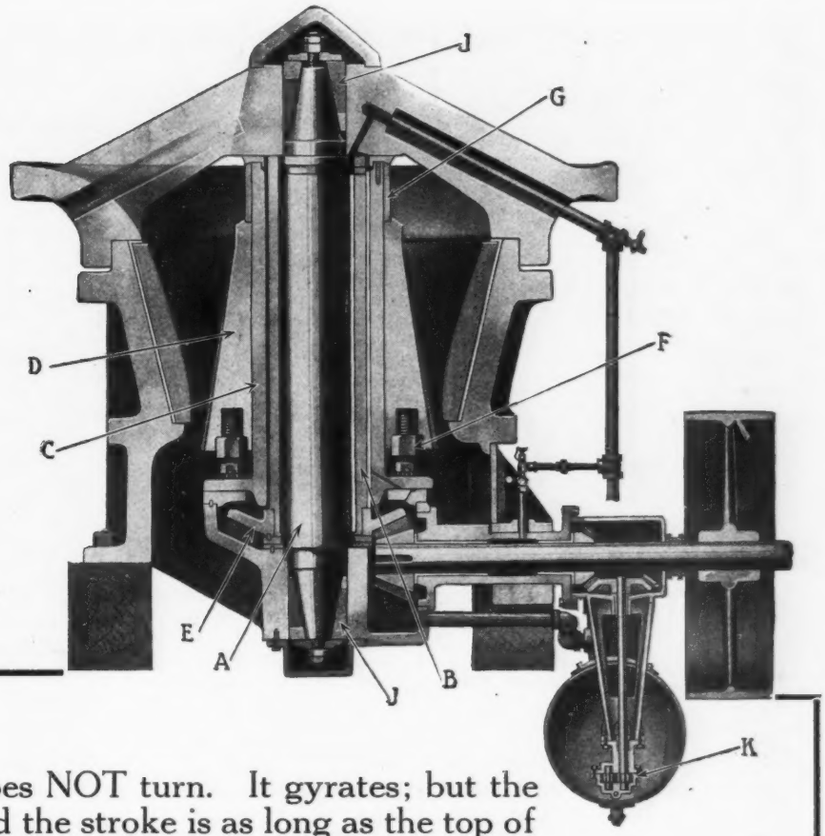

Advertisement Number 6

No, sir, the head does NOT turn. It gyrates; but the gyration is horizontal and the stroke is as long as the top of the head as at the bottom.

Telsmith is the only breaker that exerts the full crushing stroke on the big lumps; and yet this is the point where a long stroke is most necessary. Why dally around with a stubborn chunk of hard rock? Why let him slip and jump for half a minute before breaking? Why cut the breaker's capacity with an inadequate initial "bite"? Better settle the matter with just one long, straight, decisive stroke—the Telsmith parallel pinch.

As Telsmith is sometimes confused with crushers of the "coffee mill" type, the following explanation may be helpful:

A—Short, unbreakable pillar-shaft. This shaft does not turn or gyrate; but is keyed to the bottom hub of the frame. Expansible taper bushings (J) keep it tight at top and bottom.

B—Long sleeve eccentric driven by steel gear (E). It turns on shaft (A); acts directly on head; and produces a horizontal gyratory stroke. Eccentric bearings are renewable babbitt sleeves.

C—Flanged head liner, on which head is raised or lowered to change discharge opening. A feather key prevents the head from turning on the liner. Head and head-liner function as one piece, except for adjustment of head (D) by jack-screws (F).

D—Crushing head. Furnished in manganese or chilled iron. Note the immense area of head, due to the fact that diameter is enlarged to accommodate head liner and eccentric.

E—Two-piece distance rings. Several sets furnished to allow different adjustments.

Full particulars in catalog No. 166. Also glad to send you our bulletin No. 2-F-11, covering reduction crushers.

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Franklin and Channing Aves., St. Louis, Mo.
Salt Lake Hardware Co., Salt Lake City, Utah.

Rock Products

Vol. XXII Chicago, October 25, 1919 No. 22

Freight Rates on Mineral Aggregates

United Front and Ability to Offer Constructive Suggestions Sole Hope in Averting New Rate Increases

MORE AND MORE PRESSURE is being brought to bear on the Railroad Administration to grant a blanket increase in railway rates. Thus far Director General Hines has maintained an attitude that there should be no general increases before the railways are returned to private ownership, the first of next year. In the meantime he would have the individual railway companies file tariffs to cover their needs. The railway executives are opposed to this and insist on blanket increases. These increases—in freight rates—are variously estimated at from 30 to 50 per cent of present rates.

Only two months, at most, remain before this question will be decided. Isn't it high time that mineral aggregate producers were marshaling forces to meet this crisis? Freight rate increases of 50 per cent on the majority of commodities will be regrettable, but will not be a vital factor in their future production and marketing. With mineral aggregates — the lowest priced commodities moved by the railways—the case is entirely different. An increase of 50 per cent in the present rates would certainly be little short of a calamity to the entire industry.

It is not necessary to rehearse the arguments against high freight rates on crushed stone, sand, gravel and slag—they are well known to every producer who reads or hears. During the present season a considerable number of operators have had plenty of actual demonstration of what the last freight rate increase could do to destroy their former markets.

"United We Stand—Divided We Fall"

Supposing the need of a general increase in freight rates is acknowledged, as it universally is, is it possible to head off the increase as applied to mineral aggregates? Many well-posted men who have studied the question believe it is possible. First and primarily because it would be against the best interests of the railways themselves. It can be demonstrated conclusively that such an increase would deprive them of a *source* of income, rather than *increase* their revenues. It is a well established fact that increases in rates by public service corporations result in decreased revenue, where such corporations are rendering any kind of service which can be dispensed with. Stone, sand and gravel are so widely distributed that aggregates of *some kind* could be produced in almost any locality, and their movement by railways could be very nearly dispensed with. It is not likely that the railways under private management would desire this result.

But the prime essential in any project to defeat an increase in freight rates on mineral aggregates must be absolute unity of purpose and unity of action. There is no reason and no excuse for sand and gravel and crushed stone men working at cross-purposes for temporary advantage over one or the other. A tendency to do this has most unfortunately developed in several localities during this present working season, and although much damage has been done the cause, it should still be possible, in the face of so great a crisis, to work together harmoniously.

A proper course of action for mineral aggregate producers seems to be to stand behind the Director General of Railroads and work actively, individually and through their associations, to prevent any general rate increase by the Railroad Administration or by Congress before the first of the new year; to insist that the individual railways be compelled to show cause for rate increases, and that they first do as all other business enterprises have to do—make every effort to reduce operating costs by efficient management, something which they haven't had in a long time.

There is no logical reason why the Government and the people of the United States should guarantee the owners of railways a return on their investments any more than it should guarantee the stockholders of the Glory Gulch Gold Mine a return on their investment. Without doubt many railway companies, under their former efficient management, could earn a handsome profit with the present rates. Why should the Government guarantee a profit to those other railways which, because of inefficient management or lack of business, never did earn a profit?

An Illinois Stone Quarry Specializes in Production of Agricultural Limestone

The Lehigh Stone Co. Has Equipped Its Plant to Produce Fifteen Carloads Per Day of Agricultural Limestone

THE LEHIGH STONE CO., Kankakee, Ill., has, within the last year, opened up a new quarry and built a new crushing and screening plant.

This company is particularly favored in the quality of its raw material, claiming the following qualifications for it: The stone is a hard white dolomite. Recent analysis at the University of Illinois, covering the entire quarry, shows an average of 51.7 per cent calcium carbonate, 40.8 per cent magnesium carbonate.

In 1918 the University of Purdue tested the stone for hardness, durability, etc., and found the average French coefficient of wear to be 9.62.

Opening the Quarry

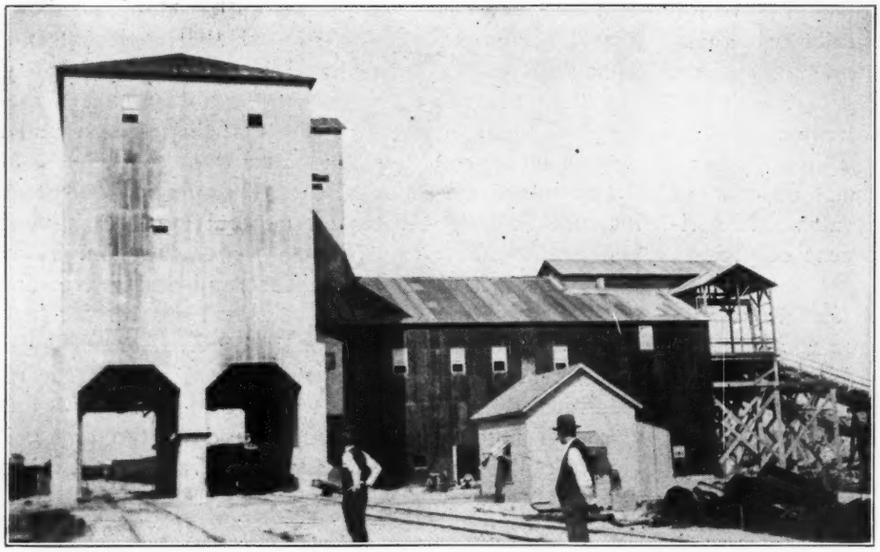
Since the stone deposit is about three-quarters of a mile in length it was decided to work the quarry in a long, straight cut. With this end in view, the following method was used in opening the pit.

The stripping amounts to but little, for, at deepest, the overburden is but three feet and the top surface of the stone deposit is smooth and clean. A steam shovel was used and thus far all dirt has been used in grading the railroad yard at the crusher.

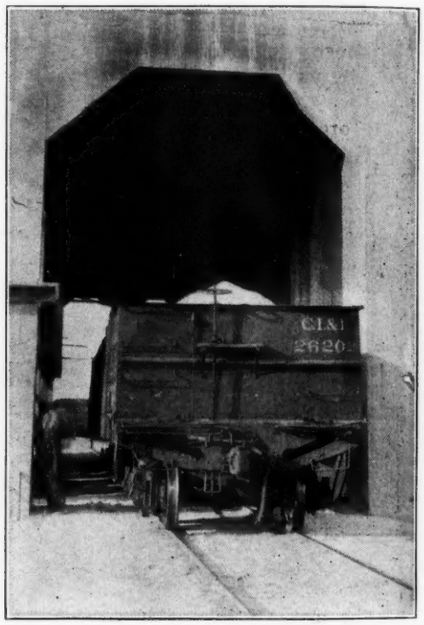
At the start of the first cut, the steam shovel was upon the surface of the rock. As fast as was possible, the shovel was inclined down until the face was 10 ft. The cars were run along on the surface and filled by the steam shovel elevating the stone into them.

As soon as was practiable, the shovel was brought back and a second cut of 10 ft. was started. This time the cars were run along on the first ledge. Owing to the fact that the shovel can not elevate the material more than 10 ft., each successive cut has been of that depth. The first cut was also comparatively short, but for each 10 ft. of increased depth the quarry has been lengthened by 250 ft.; the far end of the quarry being a 4 per cent grade to the surface.

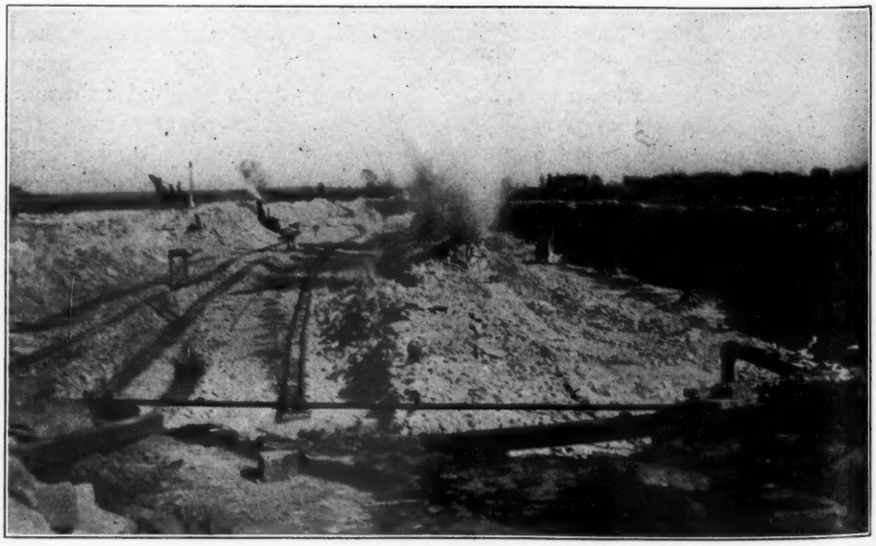
When the full length of face has been developed, the quarry floor will be lev-



Plant of the Lehigh Stone Co., with president and manager in the foreground



Hopper bottomed loading bins



A blast at the Lehigh Stone Co. quarry

eled up and the face will be about 40 ft. high. The extent of the company's holdings is 320 acres. At present the deepest end of the quarry is 35 ft. So far but little or no trouble has resulted from water. The quarry floor is maintained at such a slope as to provide ample drainage of the water to a sump hole where it is pumped to the surface.

Drilling and Blasting

Drilling is done by electrically driven well drills and the holes are staggered, two rows—the first 20 ft. and the second 40 ft. from the face—are drilled and set off at a time. A 440-volt current is used and two detonators are used to the hole. The charge is divided, two-thirds at the bottom and the rest half way to the top.

The deposit is rather thinly stratified; at the top the layers are some 2 to 3 in., but increase to 6 to 8 in. at the bottom.

Pit equipment includes a 95-c and a 70-c locomotive shovel with 5 cu. yd. and 3½ cu. yd. dippers, respectively. A 3½ cu. yd. manganese steel dipper has been ordered for the 95-c shovel.

The stone is transported from the pit to the main breaker by side-dump wood quarry cars. Before cars are put into use they are completely lined with ½ in. steel plate. A complete car shop provides for overhaul and repair of cars.

Crushing the Stone

Stone may be received at the main breaker, a No. 36 gyratory crusher, from a track on either side; that is, a double tracked incline and two electric hoisting winches enable the cars to be hauled up and deposited into the crusher from two sides. At present only one incline track is in use, but both will be in use when the quarry floor is lowered another 10 ft.

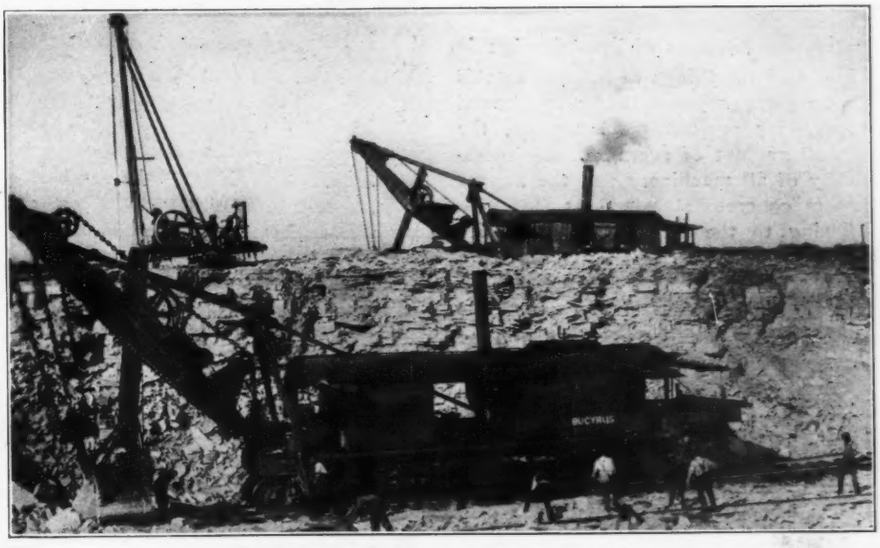
The main breaker reduces the run of quarry from 18 to 20 ins. to 6 ins. and under. From the initial crusher, the material is emptied directly into the elevator and is elevated to the scalping screen. This screen has two primary functions; first, to eliminate all 1½ in. stone and above, classifying any size needed, and second, to reject the oversize to a battery of five No. 6 gyratory crushers.

Screening Arrangement

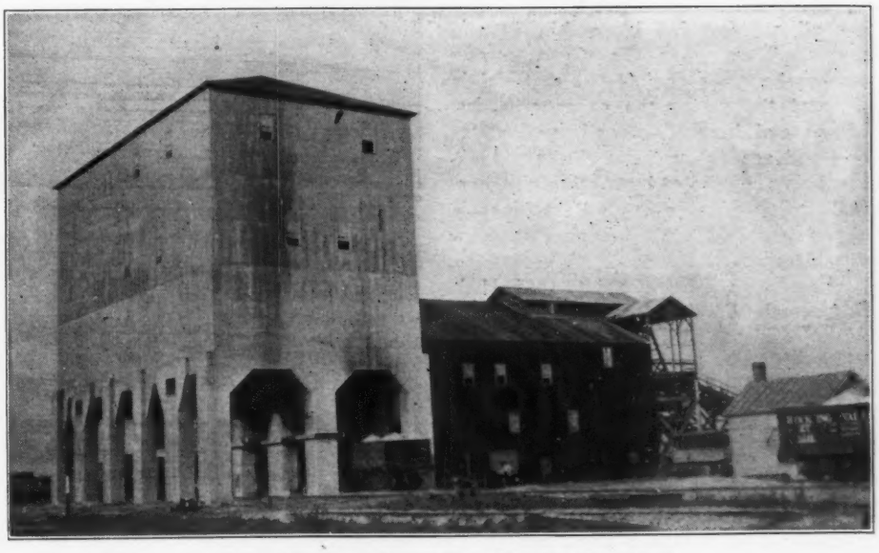
All the material less than 1½ in., and any other size required, is elevated to the sizing screens which are mounted parallel on the same floor level, stone from the crushers entering the north screen first. Its first perforations are 1¼ in. with 1 in. jacket, so that all material 1 in. and under is passed in the first stage of the screen. A belt conveyor delivers the 1 in. down material to the second screen, where it is classified and distributed in the various bins.

Both screens are jacketed and about

Opening quarry to give a long face



Three operations, stripping, drilling and loading stone



Staunch, concrete construction for the plant

60 in. in diameter and are 24 ft. long. The whole plant is electrically driven; the two screens and elevator being shaft driven by a 100-h. p. motor.

Production of "Agstone"

A combination of circumstances such as a suitable stone, a large per cent of fines and great demand for such material has caused this plant to be especially equipped to produce agricultural limestone. Part of this is produced at the jacket of this second sizing screen.

Just at the side of this screen is a small roll crusher which will handle ¾ in. material or under, down to 10 mesh. A larger roll is also provided which will reduce 1½ in. material to agricultural limestone. When, as at present, the demand for agricultural limestone is very large, the large sizes of stone—any size not needed—may be fed back to the battery of secondary crushers to be reduced so that it can be handled by the roll. The output is 15 cars per day.

Interesting Features of Plant Design

Some of the things of interest in this plant are the proposed 100,000 ton ground storage for agricultural limestone, the unusual amount of room and the accessibility of all machinery and the hopper bottom concrete storage bins.

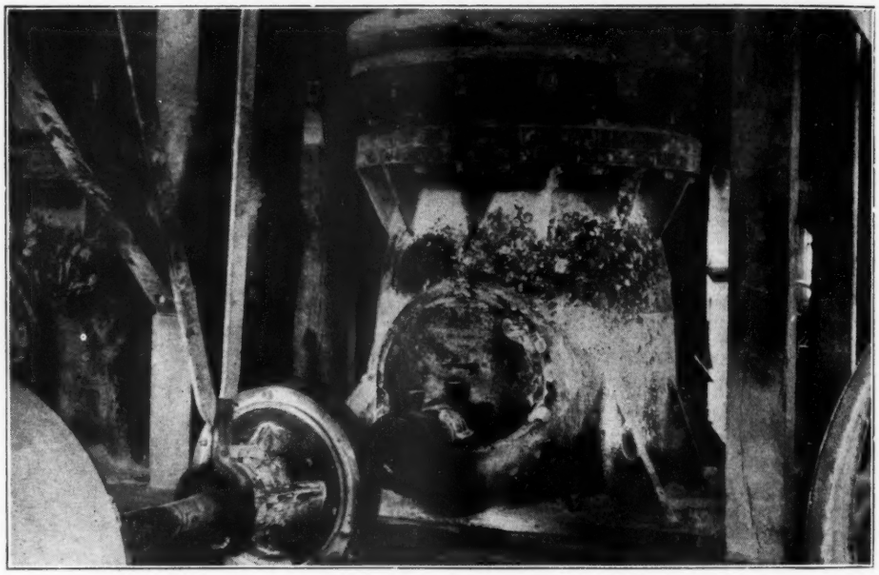
Owing to the fact that demand for agricultural limestone is limited to a couple of months per year, it has been concluded to insure a steady run of the plant by the addition of this storage space.

The hopper bottomed storage bins will make this an easy matter. Belt conveyors will be fed from the bottom of these bins and will carry the material into a large field at the side of the plant.

The ten 200-ton capacity loading bins and the floors upon which machinery has been installed are of reinforced concrete.

Simplicity of design was insured by grouping the secondaries so that they are all gravity fed by a bin in the center. Thus when the chute to one crusher becomes choked the material is diverted to one of the other crushers. They are all bedded on one large foundation and are driven from shafts; operation being controlled by friction clutches. Each independent group of machines is driven from a lineshaft connected to a suitable motor.

The officers of the company are: M. J. Edgeworth, President; W. R. Sanborn, Vice-President and General Manager; W. A. Bollman, Secretary and Treasurer, and T. M. Hunt, Superintendent of plant.



Above, Loaded cars leaving plant. Middle, Crusher drive controlled by friction clutch. Below, Crusher and scalping screen arrangement.

Design of Large Rock-Crushing Plants

Part V—Separation of Commercial Sizes — Computing Screening Area — Importance of Adequate Quarry Stripping—Distribution

By Brownell McGrew

IN CONNECTION with the following article the reader is asked to refer back to Part III of this series of articles for the description of the gradation curve and the flow sheet and their uses. The study of these two diagrams is essential to an understanding of the subject of separation and distribution of the material.

Separation

In straight flux and straight ballast plants the factor of separation is reduced to its simplest aspect. The same is true of plants built to produce crushed stone for chemical purposes. The number of grades required seldom exceeds four or five; and frequently is as low as two. Generally a single battery of screens, equipped with the necessary perforations will do the work. If any re-crushing is to be done, the rejections may be re-elevated to the same set of screens.

In the plant erected for general commercial purposes the screening proposition is more complicated; and in those plants which are built to supply a combination flux, ballast, and commercial trade, the problem becomes one that demands the highest engineering skill.

The possible combinations and varied arrangement of separating screens are so infinite that it would be idle to attempt a detailed description of them in an article of this length. The writer hopes that an exposition of some of the more important principles involved may aid the designer in choosing the proper equipment, and in its disposition.

One of the mistakes most frequently made is that of not putting in enough screen area to take out the stone. This is no doubt due in many cases to the fact that the areas are figured for *average* plant capacity, and not for the maximum that may be put through the screens for short periods.

The peripheral speeds of the different diameters of screens are as a rule very nearly the same, long experience having shown that a speed of around 200 ft. per minute gives good results. The pitch or inclination, most commonly used is 1¼-in. vertical to 12 in. of screen length. At the pitch and speed mentioned, the lineal velocity of the stone through the screen will be in the neighborhood of 25 ft. per minute.

It can readily be seen that, pitch and peripheral speed being equal, the small diameter screen will pass the same area of screening surface under the stone in a given time as will the larger screen. On the face of this it looks as though the small screen would then do the same work as its larger prototype. So it would—provided the stone could get to the perforations. But, the higher the ratio of the area of the body of stone is to the total screen area, the lower the efficiency of the screen will be, for the simple reason that it takes the screen longer to sift the required size out of a deep body of stone than it does out of a shallow body.

This is the underlying reason for the superiority of the large diameter screen over the small one. It also partly explains why a relatively greater area is required near the head of the screen, than is necessary at the middle or lower end of the barrel, to take out the same amount of material. Another reason for this latter fact is that the efficiency of a given screen section is governed also by the proportion of the body of stone that is small enough to drop through the perforations. If this proportion is high, the section will do more work than if it is low, even though the amount of undersize material passed over it in a given time is the same. The verity of this statement is exemplified in the large area required to take the fines out of coarse crusher-run.

Both of the above facts are responsible for the employment of "dust jackets," even where their use is not required to increase the number of sizes to be made from the screen. For example: Suppose that the run-of-crusher passing through the barrel of the screen varies from 6-in. ring down; and that it is desired to take from this stone everything that will pass through a ¾-in. perforation. The main barrel of the screen may be equipped for the necessary distance with 1¼-in., or 1½-in. perforations and surrounded with a jacket punched with the ¾-in. holes. Thus the two proportions, above mentioned, are reduced; and the separation can be performed with a fraction of the screen length that would other wise be required.

The velocity with which the stone comes into the screen is often instrumental in decreasing the effectiveness of the first few feet of section. The chutes should be so constructed as to cut this velocity down to the lowest practicable figure.

Computing Screening Area

Having estimated, from the flow sheet, the amount of stone of the various sizes that may be expected, the next step is to figure on the areas of the screen sections that will be needed to screen out these sizes. To the experienced operator, as well as to the beginner, the diversity of practice that exists in this respect is rather bewildering. He who seeks enlightenment through a study of the procedure in various installations, is apt to come to the conclusion that the estimating of screen areas has been largely a matter of guesswork; and in this conclusion he will be something more than "half correct."

From observance of screen performance, extending over a period of years, the writer has evolved a basis of calculation which he believes to be conservative and safe. It takes into consideration the factors influencing separation, mentioned in the preceding paragraphs; and is based, not only on the study of actual performance, but also on the gradation of crushed stone, as determined by mechanical analysis.

The governing factors are: The number of tons per hour to be screened through the section; the maximum ring size (taken at the 80 or 85 per cent point) of the bulk of the material passing through the barrel of the screen; and the ring size of the material to be separated. Formulated, the rule would read:

$$A = N\left(\frac{B}{R} \text{ plus } 1\right)$$

where:

A is the area of the section in square feet.

B is the maximum ring size.

R is the ring size of the material to be separated.

N is the number of tons per hour to be screened out.

Thus, when the bulk of the stone passing through the barrel of the screen is not larger than the size to be separated (in other words, when the ratio B:R is 1:1) a screen area of two square feet per ton per hour will give satisfactory separation. For a material ratio of 2:1 the required area would be three square feet—and so on. It should be noted that the quantity N means the number of tons per hour passing *through* the *perforations*, and *not* the total tonnage going through the *barrel* of the screen.

In computing screen areas the designer should bear in mind that the returning of

the re-crushed material back through the set of screens performing the initial separation, increases the load upon these screens. This is clearly shown in the flow sheet (Fig. 2. See ROCK PRODUCTS, September 27, pp. 16, 17.)

A study of screening cannot but emphasize the value of providing a uniform feed to the screens. If the plant is designed to handle 5,000 tons per ten-hour day, the screens should be fed at the uniform rate of 500 tons per hour—and not alternately loaded to 1,000 tons per hour half the time, and allowed to run empty the other half. Or, if the latter procedure is followed, the screens should be calculated for the 1,000 tons hourly capacity—which means that they should have twice the area that would be necessary with the uniform feed.

Another point to be noted is that in applying gradation curves which are based on mechanical analysis to actual operating conditions, an allowance must be made between the ring size of the designated product and the size of perforation that must be used in the screen. This is largely due to the fact that the stone in passing through the barrel of the screen does not rest upon the bottom of the barrel, but is carried a certain distance up the side by the rolling of the screen. Thus, the stone has to drop through the perforations at an angle, instead of falling straight through. The usual allowances made are: ⅛ in. below 1-in. ring, ¼ in. below 3-in. ring, ½ in. below 5-in. ring—and so on.

Never Neglect Stripping

While on the subject of screens and screening, the writer wishes to say a word in regard to the practice of dry-screening clay or loam overburden out of stone—a thing that is frequently attempted by the ballast or flux plant operator who wastes his fines, in the hope that he can do away with the expense of stripping. True, you can get the dirt out—if you use large enough perforations. But, with it will go an imposing percentage of the stone that you have spent time and money on, in drilling, shooting, loading, and transportation. If you stick to the small perforation in an attempt to cut down this waste, the dirt will follow your example with the coming of the first wet spell and also stick to the perforations. The place to take the dirt out of stone is in the quarry, and not in the plant. If conditions are such that the expense of stripping would be exorbitant; or if the dirt lies in interstices throughout the ledge so that it is impossible to get it out, a washing plant is the best solution. The dirt may be dry-screened from the bulk of the crushed material along with the fine and medium stone, and these screenings passed through a washing plant.

Even this method will not be effective on hard clay or "gumbo." Altogether, the safest proceeding for the operator who wishes a satisfactory output from his plant, is to see to it that the "input" is satisfactory.

In concluding the subject of separation, it is well to state that everything that has been said therein regarding screen areas, presupposes that the stone coming to the plant is reasonably clean; and, furthermore, that the screen sections are properly punched.

Distribution

Where possible, the separating screens should be so placed that distribution of the finished material from them to the storage bins may be accomplished by gravity. Even so, in plants designed for a large variety of sizes and mixtures, it will sometimes be necessary to employ belt conveyors to aid in the distribution.

The pitch of the distributing chutes should, where practicable, be about 45 degrees—never less than 40, except for very short sections, and in cases where the stone enters the chute with considerable velocity. In this connection it is well to remember that fine material requires a somewhat steeper pitch than the coarse grades.

An excellent practice is to install a box under each screen, running the full length of the sections; and to run the distributing chutes out of the sides of this box. Thus, the stone falling from the screen will strike on stone instead of on steel. If this practice is followed throughout the plant, wherever there is impact, a considerable saving in liner replacements will be effected. Where stone slides on stone, the pitch provided should not be less than 45 degrees.

Chute liners may be constructed of soft steel, high carbon steel, or heavy manganese steel plates, depending upon the service to which the chute is to be subjected.

When discharging into bins, the lowest battery of separating units should be high enough above the top of the bins to permit of a chute arrangement that will fill them to capacity—a point that is frequently disregarded, or lost sight of, in the effort to cut down building height.

[The next and concluding article will discuss the location of rejections crushers, power and general matters of design and operation.—Editor.]

Cut Limestone for Residences

BECAUSE of the high cost of many building materials and of the inability sometimes to obtain such materials at any cost, various substitutes for standard materials have been placed on the market in the last year or so. But practically every attempt to introduce new forms of material has failed.

In some cases the cost of making the substitute became so great on account of labor charges that the standard material could be used more cheaply. In other instances, where real economy could be practiced and a satisfactory material turned out which could be used with a saving on construction labor, union laborers spilled the beans by refusing to work on a building where what they called "scab" material was employed.

Old Materials Coming Back

Standard materials still hold the fort, but the probability of a continued shortage of supplies, with a big building movement trying to get under way, has caused some materials to be brought to notice which have lacked popularity in the past, probably because they were somewhat more difficult to obtain than the materials most commonly used. So the competition for designs for dwellings which can be built at a cost not exceeding $12,000, held recently by "The Architectural Review" for the Indiana Limestone Quarrymen's Association, has had unusual interest in many parts of the country.

This competition placed limestone for residential buildings in a new light before the public, for few people know that an almost unlimited supply of this good-looking stone exists within 800 miles of New York, a stone that can be easily worked, sawed, planed, turned and carved, and still is within the financial reach of the average home builder.

Not long ago the average man would have scorned the suggestion that he use stone in the construction of his home, largely because he could not visualize such a building. But supported by the work of skillful architects and backed by the efforts of producers of the material, limestone seems to be in a fair way of becoming a much used material in future home construction.—New York Tribune.

Indiana Stone Men Busy

BEDFORD, Ind.—The stone business in this district is on the biggest boom in its history, according to newspaper reports. More work is being done in the mills than ever before, and in the quarries the mud of war days is being cleared away and new stone taken from the ground.

Reports throughout Monroe and Lawrence counties confirm all this.

One reliable indication that mill machinery is humming more busily than ever before is in the statement of M. D. Atwater, service director of the Public Utilities Commission, who has made the statement that 15 per cent more electric current is being consumed in the operation of the stone mills than ever before.

Educating Rock Product Employes in Crushing, Grinding and Packing Plants' Safety

To Insure Safety, the Workman Must Be Educated and Interested in Safety Work

By J. C. Josse,
Superintendent, Continental Portland Cement Co., St. Louis, Mo.

THE NATIONAL SAFETY COUNCIL'S General Manager, Mr. C. W. Price, tells us that if those who lose their lives in preventable accidents every year in the United States were laid shoulder to shoulder they would make a path 6 feet wide and about 14 miles long and those seriously injured would make a path 6 feet wide and 786 miles long. Think of it, more than a round trip from St. Louis to Cincinnati.

When you think of those paths, don't you believe it is time that safety work and safe practice education should take its place where it belongs, at the very beginning of all our industrial and public work, and should have a prominent part in our plant organization? Nothing pays bigger dividends to our employers, and to ourselves than safety to the employees and their families. The peace of mind, the feeling of contentment you have when you go home from the plant knowing that you have done your duty toward your fellowman in trying to keep him alive and uninjured is certainly worth all the effort you can put forth in that direction.

I have been asked by Mr. Jacobsen to prepare a paper on educating cement plant employees in safety. This subject is extremely important to us all. We should bear in mind that owing to the many different hazards in and around our plants a great deal of time and attention is required to get results, and only by giving the best that is in us and by constantly keeping up the interest in the work can we accomplish anything worth while.

I shall endeavor to explain the method used in our work at the Continental plant.

Safety Methods at Continental Plant

Shop Safety Committees

The first move in our safety work was to join the National Safety Council, and when we began to receive those splendid posters and other valuable information we began to get busy. We put up our bulletin boards in conspicuous places throughout the mill. About this time insurance inspectors recommended various guards. We started putting up guards and other safety devices and our insurance rates kept rising at regular intervals and while the guards did some good the net results were not what we had hoped for. Then we began our campaign of educating the foremen. This you will find is essential. A foreman must be a safety man or his value to the organization decreases materially. To sell the foremen the safety idea is the hardest problem of all; but after they are sold, they usually remain good safety boosters.

Our first shop committee consisted of all foremen, and we got some good results, but we found we were not reaching the men, although an opportunity to drive home the safety idea was never allowed to pass. We kept men constantly at work building guards, replacing ladders with stairways made of steel and with steps of steel grating to prevent the settlement of dust, but still our results were not what we thought they should be. It was only when we conceived the idea of taking the rank and file for our shop committees that we got the real results.

This result was attained by giving the men something definite to do in this great work, to make them feel that they were an important factor, and that we had to have their co-operation to be successful. That this work was for the benefit of themselves and families. That they and their families are the real sufferers in case of an accident. That their financial burden in case of injuries is far greater than the employer's, and that in no case does insurance compensate the full income loss, to say nothing of the pain and suffering. When you get the men to see and realize this, then you begin to get the results of your work.

Educate Workmen

We found the very best way to do this was, after a certain amount of preliminary education, to give the workmen something to do in this movement. So we organized our plant into eight departments, each department has a shop committee of three, appointed for three months, and each member is designated by a big white button with the words "Safety Committee" on it.

These shop committees are composed of men taken from the rank and file, and they make their reports to the central committee, which is composed of three men who are graduates of the Safety Supervisors' school, that was conducted in St. Louis by the Mississippi Valley Section of the National Safety Council last winter. The recommendations are acted upon in their turn, and it is astonishing how many practical recommendations are made and how few are impractical.

Each plant will have some problem that will not lend itself to any hard and fast rule, and there may be other plans that will work out as well, as the one just explained, but all those who have tried this method have been well pleased with the results.

The most important thing, in my opinion, is to get the co-operation of the men themselves, and the matter must be placed before them in the light that safety work is to their benefit and welfare to a far greater extent than to the employer. When you succeed in doing this you will get results.

This paper was delivered at the Eighth Annual Safety Congress of the National Safety Council.

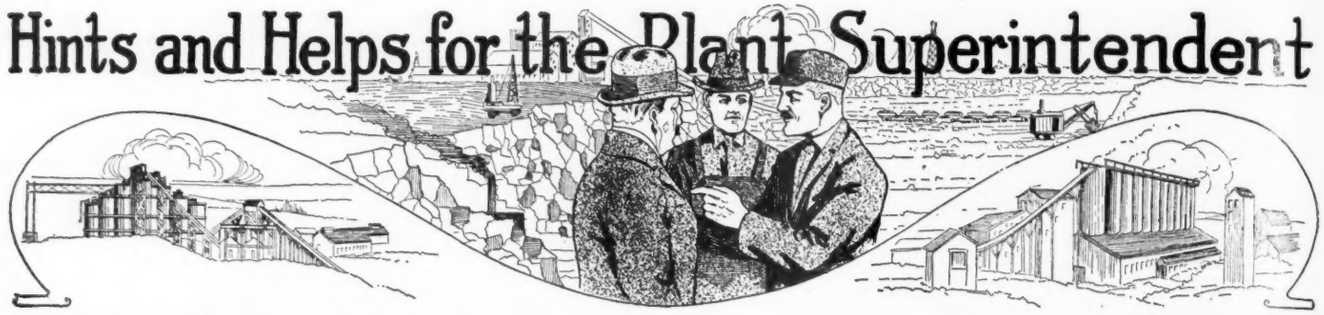
Director General Hines Urges Speedy Action

DIRECTOR GENERAL HINES has stated that the government will make no general readjustment of rates prior to January 1, 1920. This will stabilize business dependent upon freight rates, until that time at least. He has also written to Senator Cummins and Representative Esch, Chairmen of the Interstate Commerce Committees of the Senate and House respectively, earnestly urging the passage of railway legislation at the earliest possible date. He says:

"Pending the passage of railroad legislation, uncertainty naturally exists. Such uncertainty makes it impossible for the government to plan or carry forward necessary additions and betterments, and to acquire essential new equipment. And such uncertainty likewise makes it impossible for the railroad companies to make such preparations.

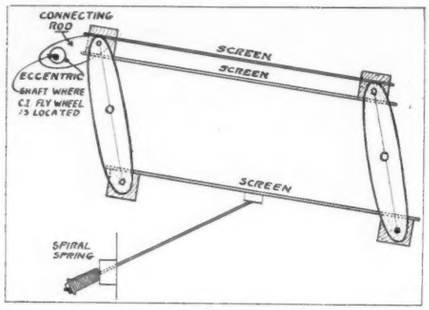
"In order to keep abreast of the growth of business of this country, it is indispensable that the railroads should continue to spend large sums in the acquisition of new equipment, the enlargement and unification of terminals and the construction of additional and the enlargement of existing shops, engine houses, turntables, etc., and in the carrying forward of normal programs for the revision of grades, construction of additional main tracks, longer and more numerous passing tracks, etc."

Hints and Helps for the Plant Superintendent



Reducing Vibrations from Shaker Screens

THE BELLEVUS QUARRY of the France Stone Co., has a set of double decked shaker screens which do not vibrate nearly so much as the average screen of this type, due to the use of a heavy spring. It is claimed that before the spring was used, the screening platform vibrated considerably.



Double deck shaker screen

The accompanying diagram shows a section of the screen and spring, which needs but little explanation. The spring is of the ordinary heavy spiral type.

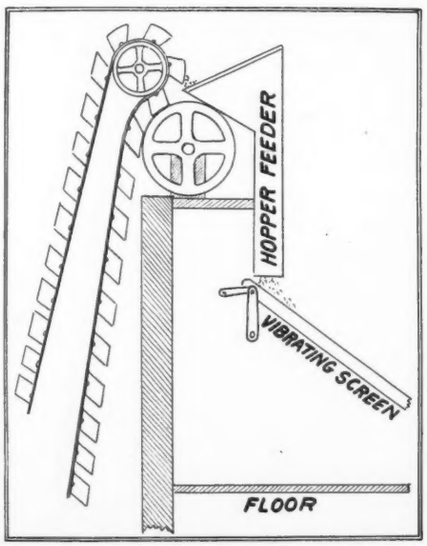
In setting up on it, the connecting rod was disconnected, and the adjustment nut on the end was screwed up on, until the screen would not quite take a full stroke.

To further reduce vibration, a heavy cast-iron flywheel was mounted on the eccentric shaft. It is claimed that this not only reduces the vibration, but that it also reduces the strain on the engine, since the torque tends to carry the motion over the dead spaces.

Compacting an Elevator

THE COLUMBIA QUARRY CO., St. Louis, Mo., recently moved its agricultural limestone plant at Columbia, Ill., into the crushing plant proper. The change involved the placing of the pulverizers and screens where there was room for them, rather than in making an ideal layout.

The vibrating screen for separating out the agricultural dust was placed in the second story of the plant over the pulverizers. There wasn't an overabundance of space in the building, so the belt and bucket elevator from the pulverizers was placed outside the building.

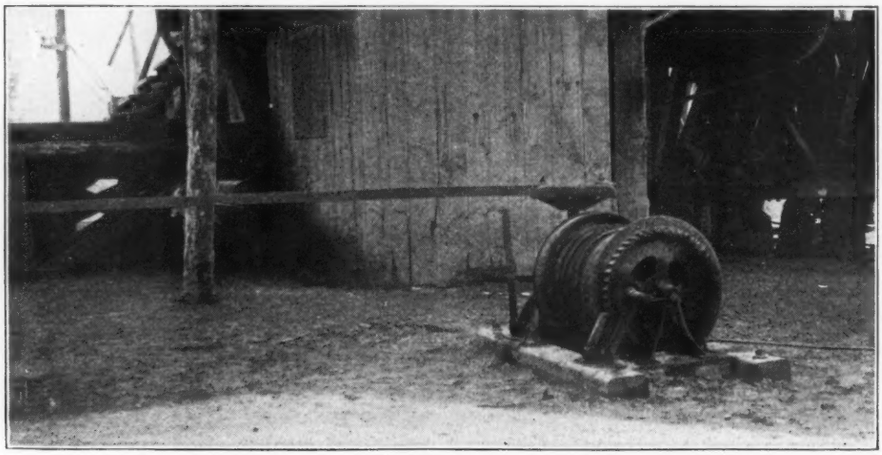


Crowding elevator outside a building

To prevent opening the whole side of the structure for the elevator operation, only a hole was cut at its discharge end. Then instead of allowing the elevator to sag down. as is ordinarily done, a pulley idler was placed under it, which crowded the belt and buckets out of the small opening in the upper wall.

The operation of the idler is unique; it goes by jerks as the buckets come in contact with its driving surface. But strange to say, the buckets are in no way injured. The elevator has now been in operation several months with entire satisfaction.

The vice-president and treasurer of the Columbia Quarry Co. is E. J. Krause, a director of the National Crushed Stone Association, and C. P. Tigges is secretary and sales manager. The superintendent in charge of the plant is C. E. Klaus.



"Horse-power" car puller that might be power driven

Spotting Cars at Bins

THERE IS NO EXCUSE in these days of labor scarcity for the old strong-arm method of moving cars with a pry-bar between the wheel and the rail. Of course, the best method of spotting cars under loading bins is by gravity—putting the tracks on a grade.

A number of plants still use a car-puller of the turnstile, horse-mule power kind illustrated. This may answer where a horse is kept at the plant, but it generally would not require much ingenuity to hook up a hoist of this kind with a shaft or pulley; or if electric power is available, an electric motor is, of course, the proper solution.

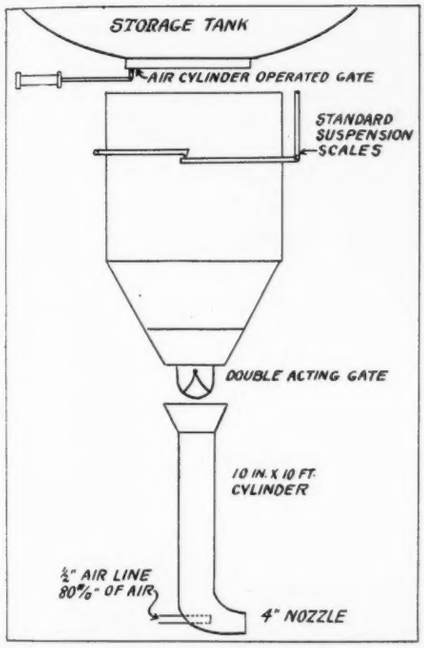
Question Box

GOT a problem you want help on? Send it in. We will agree to find some operating man who can answer it.

Loading Cars by Air

THE DOLOMITE PRODUCTS CO., Maple Grove, Ohio, has a proposition of weighing and loading a fine pebble material, called magnefer. Since the plant has abundance of air, the following apparatus was devised by Walter Patnoe, mechanical engineer.

The bin in which the material is stored is cylindrical and is some 30 ft. above the loading track. A standard suspension scales of four tons capacity was installed immediately beneath this. The flow of material from the bin to the scales is regulated by an air cylinder operated gate.



Device to load pebble material by use of compressed air

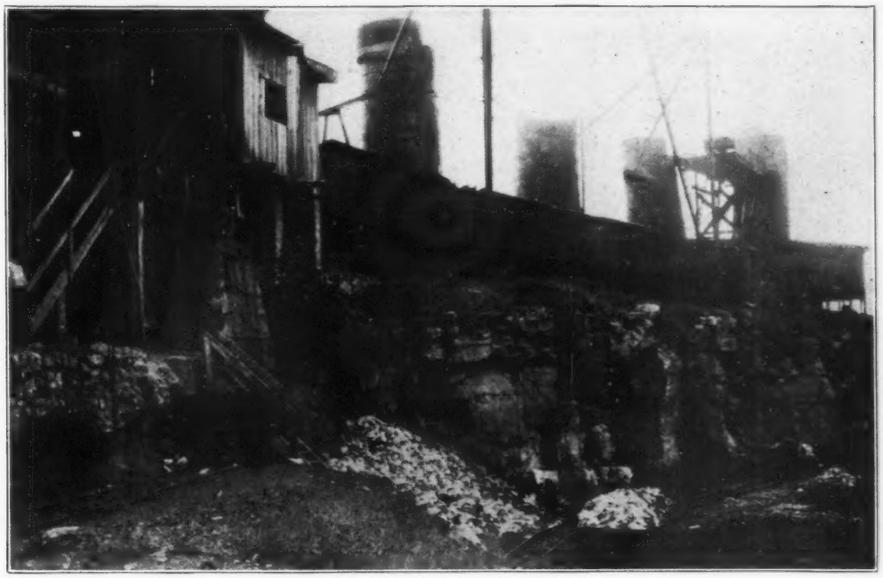
After a hopper of material has been weighed, the double acting gate in the bottom of the scales hopper is opened and the material falls into a galvanized pipe 10 in. in diameter and about 10 ft. long. The loading apparatus has a capacity as great as the scales; that is, as fast as the material is weighed it is run into the loader, and while it is being loaded a second batch is being weighed. This enables a continuous process. At the lower end of this pipe, which is just the height to enter a box car door, there is a reducing elbow to 4 in. diameter.

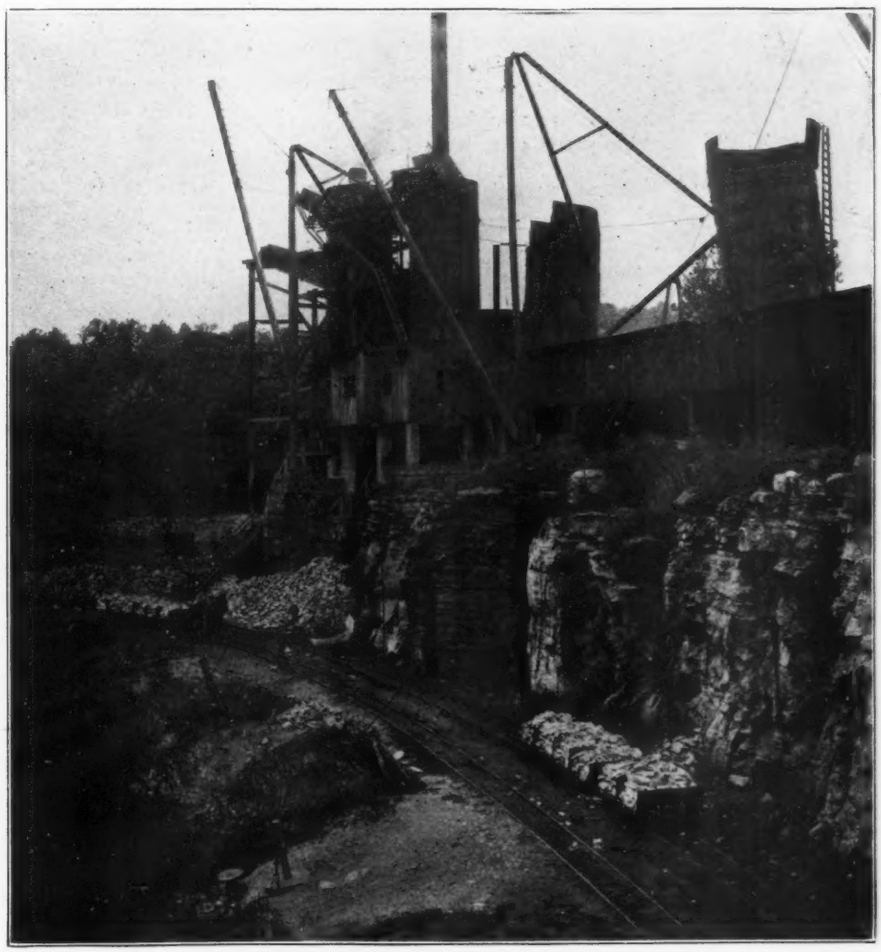
A ½-in. air line enters the rear of this reducing nozzle and 80 lbs. of pressure is found to be sufficient to blow the material the entire distance to the end of the car.

This is something like the scheme used at the Buffalo plant of the Michigan Limestone and Chemical Co. to load agricultural limestone in box cars. (See ROCK PRODUCTS, April 24, 1918.)

Derricks for Charging Lime Kilns

THE LIME KILNS shown in the illustrations below were once equipped with the customary trestle from the quarry to the tops of the kilns and with an elevated dumping track for charging the kilns. A fire destroyed the trestle and the derricks were substituted—temporarily—but were found to answer the purpose fully as well as the track. The stone skips lift off of the car trucks on a three-line sling.





Charging lime kilns with stiff-leg derricks

Specifications for Sand and Gravel

Second Article—Roofing Gravel—Paving Sand—Cushion Sand—Asphalt Sand

THE FIRST ARTICLE of this series, begun in the October 11 issue, described the requirements of sand and gravel for mortar, plaster and concrete aggregates.

Roofing Gravel

In the construction of flat or gently sloping roofs, especially in cities and on railroad construction, there is a heavy demand for roofing gravel. As produced by most plants, roofing gravel is so screened as to pass a ¾-in. screen and be retained on a ¼-in. screen. One company reported its roofing gravel as from ½ to 1 in. This latter is unusually coarse. Several companies put out grades known as fine and coarse roofing, varying slightly from the standard given. The gravel must be coarse enough not to be carried off the roof when the sun is hot enough to cause the tar to flow, and must be sufficiently rounded not to cut through the tar-paper bed of the roof.

Paving Sand

Pavements of brick or stone block consist of three portions, the foundation, the cushion layer, and the wearing surface.

Although many pavements are laid directly upon the sub-grade without any special foundation, the best practice for permanent pavements demands some special foundation unless the subsoil is of a particularly favorable character. Foundations vary considerably. Usually, the most permanent and ultimately the most satisfactory foundation is concrete. For sheet asphalt pavement, concrete is almost indispensable. Sand and gravel for concrete pavement foundations demand essentially the same specifications as for other types of first-class concrete work. These have already been given.

A mixture of gravel and sand is often used as a foundation for brick or wood pavements. The mixture is laid loose and is compacted by rolling. The layer should be from 6 to 12 in. thick, depending on the traffic, the nature of the soil, and the drainage.

Sometimes sand without gravel is used, especially for stone-block pavements, the sand not only making a good bed in which to lay the thick and thin stones, but also making it much easier to maintain the proper level of the surface of the blocks.[1] The sand or gravel should preferably be reasonably sharp, because sharp sand rolls less and binds better. In order to insure proper drainage, sand and gravel for pavement foundations should never contain more than 15 to 20 per cent of clay.[2]

[1] Baker, I. O., A treatise on roads and pavements, 2d ed., p. 384, 1914.

Sand for the Cushion Layer

In brick, stone, and wood-block pavements, there is usually between the foundation and the wearing surface a thin layer (½ to 2½ in.) of sand known as the cushion, its purpose being to secure a uniform bearing for the blocks and to insure suitable bedding for uneven blocks. The sand should be fine and without pebbles, so as to give a soft, smooth surface. It should be free from loam and vegetable matter which might decay or be washed away, thus allowing the pavement to settle;[3] it should be sharp, as sharp sand is less mobile; and it should be dry enough to pack well.

Sand for Asphalt Pavements

In asphalt pavements, sand makes up about 90 per cent of the wearing coat. The sand should be clean, because clay or vegetable matter tends to prevent the asphalt from properly adhering to the grains. This applies more to the condition of the individual grains, which should be free from a coating, than to the presence of small quantities of finely divided clay, which in itself is not particularly harmful. Angular grains give slightly better adhesion, but are desirable especially because less mobile. The individual grains should be hard in order not to crush under constant traffic. A rather pure quartz sand is best. A graded sand is to be desired, because it is lower in voids, and because it takes less asphalt.[1] [2]

The above references are not wholly in accord in regard to the size of the sand. Buckley specifies coarse sand. Baker, on the other hand, makes a less definite statement. He says:

> Fine sand is usually less sharp than coarse, and the finer the sand the greater the surface to be coated, and hence the greater amount of asphalt required. . . . . On the other hand, the smaller the voids, the greater the binding action of the cement; and also the finer the sand the smaller the voids, although the per cent of voids may be greater than with sand having grains of graded sizes.

He concludes, however, that a graded sand is probably most satisfactory.

Richardson,[3] who ranks high as an authority on asphalt pavement work, says:

> . . . . Unfortunately we know too little in regard to the cause of the varying character of the particles composing the quartz sand which is used. We have not been able to tell why a certain Missouri River sand produces such a mushy mixture and is so unsatisfactory that its use had to be abandoned, or why a Platte River sand is possessed of peculiarities seen in that from no other river.

[2] Buckley, E. R., Public roads, Missouri Bureau of Geol. and Mines, vol. 5, 2d ser., p. 42, 1907.
[3] Baker, I. O., op. cit., pp. 497-8, 536-7.
[1] Baker, I. O., op. cit., p. 411.
[2] Buckley, E. R., op. cit., p. 48.
[3] Richardson, Clifford, The modern asphalt pavement, pp. 31-32, 1910.

> Difference in the shape of the grain and in the character of its surface are the probable causes, and these characteristics of a sand are, therefore, probably next in importance to the composition and size of the grains in determining its suitability for paving purposes.

The same authority, in discussing the properties to be considered in the purchase of asphalt paving sand, considers several of the many properties in detail. He says:

> *The composition*[1] of a sand, as long as the grains are hard, can not seriously affect its availability in an asphalt-surface mixture or be a cause of defects in it. Soft-grained sand should be rejected when this is possible. . . . . The lake sands often contain considerable carbonates in the form of shells, and a small amount is found in almost all. . . . . Their presence has no injurious influence on the sand as far as its use in asphalt surface mixture is concerned. . . . . A clean sand is in any case probably more desirable, although satisfactory results have been obtained with many loamy ones. . . . . Organic matter in the shape of vegetable debris is sometimes found in sand. It is usually removed in screening. . . . . If this is not possible and the amount remaining is excessive the sand should be rejected.
>
> *The shape of the grains*[2] of a sand has a marked influence, when combined with their size and grading, upon the character of the asphalt surface mixture made with them. . . . . Mixtures made with round-grained sands are of course less stable . . . . than those made with sharp sand, since round particles move much more readily over one another than sharp ones; but, on the other hand, with plenty of filler this tendency can be neutralized, while the round-grained sands can be packed much more readily and closely and with smaller voids and the resulting surface can, in this way, be made denser.
>
> *Surface of Sand*[3] The different kinds of surfaces have quite differently toward asphalt cement. The porous limestone surfaces absorb it, and it, of course, adheres very firmly. To the quartz surfaces the bitumen adheres, in most cases, well.
>
> *The size of sand grains*[4] in an asphalt pavement, that is to say, their average diameter, is of the greatest importance. . . . . In a standard sheet asphalt surface it has been found generally preferable to have no sand grains larger than 2 millimeters in diameter, passing a 10-mesh sieve made of wire .027 in. in diameter, or smaller than .17 millimeter, which pass a sieve of 100 meshes to the inch, made of wire .0043 in. in diameter.

In another place Richardson says:[5]

> Bank sands . . . . are oftener to be obtained of that degree of fineness which has been found to be such an essential feature in our modern mixtures, that is to say, of 80- and 100-mesh size.

It must be said, in the final summing up, that results of actual use should be given greater weight than chemical and mechanical analyses.

[1] Richardson, Clifford, op. cit., pp. 53-56.
[2] Op. cit., p. 57.
[3] Op. cit., pp. 57-59.
[4] Op. cit., p. 59.
[5] Op. cit., p. 46.
[1] Hutchison, L. L., Preliminary report on the rock asphalt, asphaltite, petroleum, and natural gas in Oklahoma, Oklahoma Geol. Survey, Bull. No. 2, pp. 90-93, 1911.

[The next article of this series will discuss gravel for railroad ballast, foundry sand, engine sand, filter sand and gravel and glass sand.—Editor]

Unusual Grizzly-Crusher Combination for Gravel

Kalamazoo Plant, Recently Taken Over by the Greenville Gravel Co., Also Has Some Unusual Accessories

ONE OF THE PLANTS most recently taken over by the Greenville Gravel Co. is at Kalamazoo, Mich., or rather, three miles north of that city. This is comparatively a new plant, having been worked only about three years. It is one of the few plants owned by this company which was not designed nor built by it.

The site of the pit was a hill only a short time ago, a dragline bucket having been used to open the bank. Originally the plant had a capacity of only 500 tons a day, and a dragline bucket proved very satisfactory in handling the material down to the grizzly hopper. Now that the business has increased to 2,000 tons daily, and the pit is large enough to permit of steam shovel operation, a small ¾-cu. yd. tractor steam shovel has been added to the pit equipment. Eventually, the dragline bucket will be taken out and a larger railroad shovel will be put in its place.

Hillside location of screening plant

Electrically Operated Throughout

The entire plant is driven by motors varying from 1½ h. p. to 100 h. p. The screens are driven by two 10-h. p. motors; the conveyor by a 25-h. p. motor; the special crusher by a 25-h. p. motor; the other crushers and elevator by a 100-h. p. motor; two pumps by 75-h. p. and 50-h. p. motors, and the dragline hoist by a 75-h. p. motor. It is claimed that the plant proper has a low horsepower consumption for a plant of its capacity. One reason for this is that the belt elevator, from the unloading hopper to the initial screen, is only about 60 ft. long.

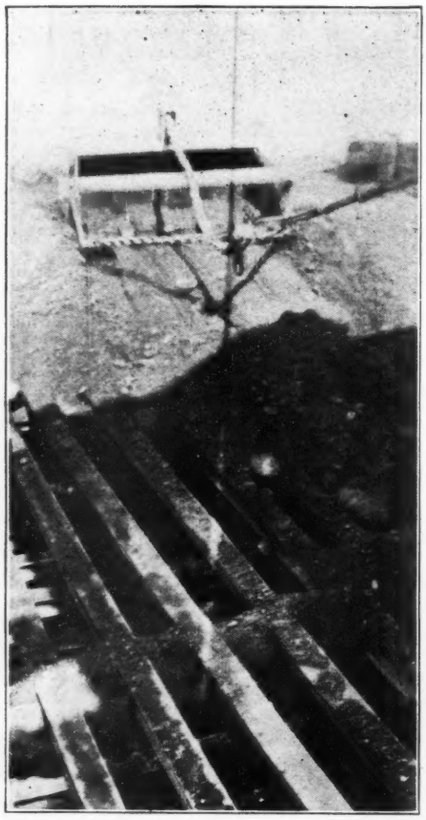
In building the screening tower, due advantage was taken of the hillside condition, and the dumping hopper is on a level with the pit floor. Such an arrangement permits the use of a scraper drag bucket and eliminates the usual incline and hard pull for the locomotive to the hopper.

Special Auxiliary Crusher

The grizzly, as can be seen in the accompanying view, is made of heavy I-bars set 8 in. apart. These bars are slightly sloping and at the lower end there is a special jaw crusher to take care of the material over 8 in. It has an 18x30-in. opening and is driven by a separate motor. All the material that passes through the grizzly goes directly to the conveyor, and the large material joins it after having gone through the crusher. Then it is all elevated to the initial gravel screen, where the gravel and the crushed material are separated. The material less than 2 in. goes through the gravel screen, and that over 2 in. is chuted to the recrushers, after which, by

350 ft. suspension bridge

Dragline bucket brings material to grizzly



Drag bucket approaching grizzly

means of a steel-pan elevator, it is sent to the crushed gravel screen.

One of the unusual things about this plant, as a gravel proposition, is the operation of the crushing plant. Since only a small per cent of the material is over 8 in., the primary crusher is not operated all of the time. Two men are employed at the unloading hopper to keep the grizzly free and to roll the big stone down to the lower end near the crusher. When a sufficient quantity has accumulated to justify the running of the crusher, it is started and the rocks are fed into it. In this manner, the large stones are disposed of without blasting, and the labor and delay of getting them out of the hopper is done away with, while the big crusher is operated only the actual time that is required, which some days is only an hour or so. The big special crusher is one of the latest additions to the plant, and because of its arrangement does not require more handling of the stone than where the ordinary single-stage crushing plant is in use.

Screening Plant

Both the gravel and the crushed gravel screen are of the double-jacketed, cylindrical type, as shown in the accompanying illustration. These are great favorites with the Greenville Gravel Co., and will be found in quite a number of their plants. The gravel screen is 18 ft. long and the inner barrel is 42 in. in diameter, while the second screen extends only half the length of the inner screen and is 66 in. in diameter. The outer jacket is 84 in. in diameter. Material less than ⅜ in. from the cylindrical screen goes to the small Gilbert screen, where pebbles are made and the sand is separated and carried to a sand box 12 ft. long and 8 ft. wide. The screens for crushed material are very similar to the gravel screens, except that they are a little larger in diameter. Commercial sizes from 2 in. to builder's sand are made. The crushed gravel may be screened either dry or wet.

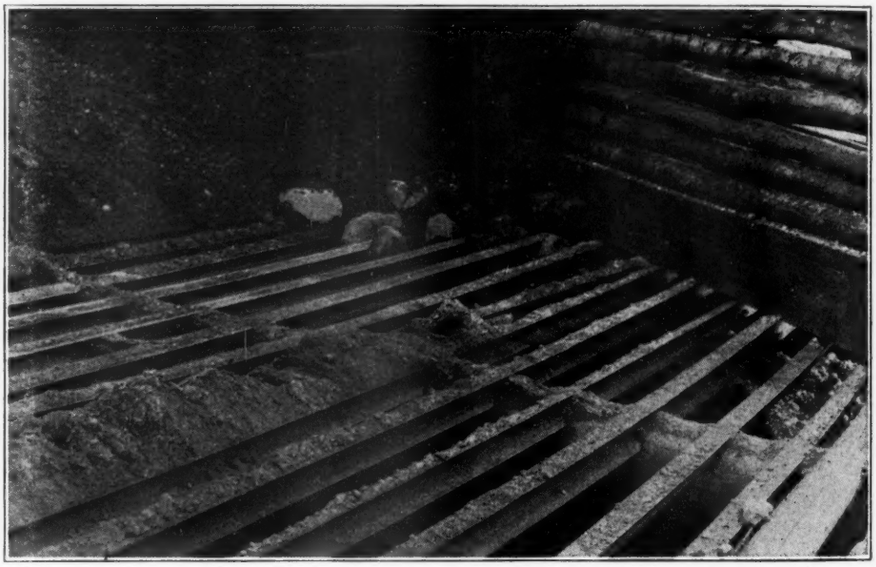
Water is supplied to the plant at a low cost from the Kalamazoo River by two centrifugal pumps driven by 75- and 50-h. p. motors. The river also furnishes a means of getting rid of the waste water and dirt by means of a flume.

Unusual Plant Accessories—Suspension Bridge

Some of the interesting side-lines in the operation of the plant are a two-span suspension foot bridge across the Kalamazoo River, the camp and store operated by the company, and the method of supplying drinking water and fresh water for the plant.

The pit is three miles from town, and the only way of reaching it on foot is by an interurban electric line—the Michigan Railway Co.—which is across the river from the plant, across which a two-span suspension foot bridge was erected last spring. The initial span is 350 ft. and the second one is 100 ft.

It was constructed by the men at the pit during the winter months at a low cost of $300. The weight is suspended



I-bar grizzly showing the initial crusher opening at lower end

Double-jacketed cylindrical gravel screen

from two ¾-in. steel cables and the floor is a 2x10 plank. Strands of wire fencing prevent the possibility of one's falling through into the water. With but little attention it affords a very satisfactory connection between the plant and the electric railway.

Commissary Keeps Men on Job

Peculiar conditions made the keeping of a camp and commissary very desirable. The plant is too far from town to attract city labor, and local labor is hard to get and keep. The company has been operating on two 10-hour shifts and most of the men who do not live nearby find it convenient and cheap to live at the camp. At the time when the plant was visited, 35 men were sleeping and boarding there.

The office, store room and dining hall are all in one large building. A cook and helpers are employed by the company, and a supply of tobacco, candies and rough working clothes may be bought by the men and charged to their account. A charge of $7 per week is made for lodging and meals and deducted each week from the pay. A large tent is provided for housing the overflow from the permanent camp structure.

The river and surroundings are ideal for camp life and since the "grub" is good and cheaper than in town, a good many living at considerable distance stay during the week and go home over Sunday. Although the camp is not on a paying basis, the company feels benefited by it in that it helps to retain men and keeps them on the job all the time.

Running Water in Pit

Drinking water is supplied to the house and water to the steam shovel from an 85-ft. well, by a motor-operated pump. A 1½-h. p. motor pumps water to a storage tank of 12 barrels capacity, which supplies the house, wash room and boiler. Two automatic switches protect this pump, one of which is pressure operated. It is connected to the storage tanks and is so arranged that as the pressure is increased above a certain point, electrical contact is broken and the motor stops. The other is an oil stop switch which protects the motor from burning out. When the temperature of the motor is too high the oil expands and shuts off the current.

In this manner fresh water for the whole plant and camp is furnished by a 1½-h. p. electric-motor-driven pump.

City Engineer Uses Overloads

Since there are no car scales at the plant, the loaded cars must be taken to Kalamazoo to be weighed. An arrangement has been made so that in event of an overload, the company simply calls the city engineer and he will have the overload removed for the material, which is used on the city streets. This saves the time and expense of returning the cars to the plant and also helps make better city streets.

Business is very good in Michigan at the present time and the plant operates on two 10-hour shifts, when car supply will permit.

New Mammoth Distributing Company Organized

ANNOUNCEMENT is made that the United States Distributing Corporation, which was recently formed with an authorized capital of $25,000,000, is soon to engage in the extensive distribution of coal, ice, building materials and other articles and commodities, with a view to stabilizing costs to the consumer and assuring constant supply through centralization of management, purchasing, storage, etc.

George F. Getz, president of the Globe Coal Company, and member of the advisory committee of the Consumers Company of Chicago, is president of the new corporation.

It is understood that the company is shortly to offer stock to the public, not through an underwriting syndicate, but direct, the entire par value of which is to go into the treasury of the company.

Nation-Wide Building Report Shows Big Increase

THE ESTIMATED value of permits granted during August, 1919, in 168 cities totals $169,858,941, a gain of 274 per cent over the August, 1918, total of $45,431,709, according to reports received by Building Age, New York, direct from city building departments.

Again the activity is widespread, 155 cities reporting increases, as against 13 reporting losses. Southern cities report the largest gain, 445 per cent, with 37 out of 38 cities reporting increases. Eastern cities follow with 338 per cent, 55 out of 60 reporting gains. Middle States cities show a gain of 214 per cent, 41 out of 47 reporting increases; and Western cities show 94 per cent gain, 22 out of 23 reporting increases.

It is significant that the volume of construction for which permits were granted during August, 1919, is 27 millions greater than for July, 1919, when 174 cities reported, showing that the industry is in the main in a fairly healthy condition.

Strikes have acted as a strong deterrent to construction during the past month, and many buildings have been held up. The labor situation, even more than the higher level of material prices, has been a disturbing influence in the trade, especially in cities where the unions are accused of having broken their contracts. The situation is causing builders to hesitate to accept contracts on the usual lump sum basis, preferring the cost-plus-percentage or cost-plus-a-fixed-fee as being safer.

Costs have increased very appreciably since the first of the year, due to increases in wages and materials. There has been much talk of profiteering by material manufacturers and dealers, but so far no proof has been advanced of any concerted effort to advance prices. A commission appointed by the State of Illinois recently investigated material prices in that State; it found satisfactory evidence that prevailing prices were justifiable under present economic conditions. The present high prices will remain either until there is a decided lowering in the general scale of labor, or until more economical methods of construction are evolved.

Causes of Business Failure

BAD LUCK in business lies not so much in the stars as in the businessman himself, according to business statisticians. Eighty-six per cent of the business failures in the United States in 1918 were classed as due to the individual, while only 14 per cent were assigned to outside causes. Among the factors of the eighty-six per cent of failures, compilers of figures numbered extravagance, lack of capital, and speculation outside regular business.

Tens of millions of dollars were lost last year through waste of labor and material. Over $500,000,000 annually is being lost in the United States through speculation in fraudulent stocks. Lack of capital is holding up thousands of enterprises, which would go far toward meeting lack of employment and scarcity of production.

Thrift and rigid economy, both business and personal, must replace extravagance if the crisis engendered by the high cost of necessities is to be met. New capital can be produced most easily and most certainly through saving. Safe investment will add to, instead of detract from, the business assets of the nation.

"Lack of character is one of the chief contributing causes to commercial failure," according to J. Harry Tregoe, secretary-treasurer of the National Association of Credit Men. Thrift saving and safe investment not only are proofs of character, but developers of character.

R. G. Dunn & Co. reports 4,586 failures, involving $88,941,608, from January 1 to September 30 of this year. It is with the reduction of these figures the increase of production and prosperity in mind that the Savings Division of the Treasury Department is prosecuting its campaign for regular and consistent saving, the elimination of waste and for inducing permanent investment in Liberty Bonds.

The Chicago Sand and Gravel Producers Association's Daily Market Report

This Association Collects Data and Gives Each Producer a Daily Comparison of Quantity and Cost of Production

IT IS OFTEN said that still water runs deep, and so it has proved in this case with the Chicago Sand and Gravel Producers' Association. Not much has been heard of that association, while it has been busy perfecting its organization.

Among the several benefits which Chicago producers have already derived from it, has been a daily system of reporting, which is carried out in the following manner:

Data Collected on Forms

The association has issued a blank form to the producer for submitting a daily report of his output. At the end of the day these reports are mailed to the association headquarters and a summary report is made which includes reports from all of the member producers. This is entered in the second blank form and mailed back to the producer on the same day. In this manner the producer knows each day just how his production the preceding day compared with that of other producers of the Chicago district.

The Summary Comparison

The summary, or comparison report, made at the association headquarters from the daily reports and sent to each producer contains such information as would be of value to him in comparing the operation of his plant with other producers. Each plant is indicated by a number, and so, although the output of each firm is indicated, the identity of the producer remains unknown except that each producer knows which figures represent his own report.

In making this report, the material is classified as to its destination, A referring to the material delivered inside of the city of Chicago, and B to that delivered outside of the city limits. The number of tons of each grade and the total number of tons of the day's output are indicated.

The total realization for the day's production and the average realization per ton give a comparison of prices. The tonnage is again divided into three classes as to deliveries; that is, whether the material is delivered by one railroad, whether it must be transferred to a second or a third road. Since a delivery on the initial road would mean the lowest freight rate, and possibly the best return to producer; the per cent of the day's business transacted upon one line is also given.

In addition to the above information the producer is told what per cent of the total day's tonnage his plant produced, and the per cent of the total realization he received for the day's output. The per cent of the total output and realization are not fixed quantities, nor are they controllable in any manner. They vary daily as the business of the respective plants vary. Also, a statement is made to show the number of tons produced at the various prices.

The intention of this report is to induce the producer to investigate his cost of production.

Chicago Sand and Gravel Producers Association

DAILY REPORT OF CARS LOADED AND SHIPPED

_____Company _____19____

Hours Worked_____ Tons Produced_____ Total Amt. Realized_____

DIRECTIONS:—The purpose of this report is to show the tonnage actually produced and shipped. It is to be made daily in duplicate, the original being mailed Secretary so as to reach his office in first mail following morning; the duplicate to be retained as permanent record. Indicate class of customer as follows: D-Dealer; C-Consumer; M-Member. Shipments should be separated with respect to grade or size, price obtained and route used. Under "Quantity Each Grade in Tons" enter at head of column the grade number and then show the number of net tons of that grade shipped.

Customer	Class	Destination	Route	NO. CARS	FREIGHT RATE PER TON	PER TON PRICES F. O. B. DESTINATION	QUANTITY EACH GRADE IN TONS				
Total Cars and Tons each Grade											

Daily Report, filled out by each producer and sent to Association office

CHICAGO SAND AND GRAVEL PRODUCERS ASSOCIATION Date..... .....

Firm	Cars Shipped		Total Number Tons Each Grade Material No. 5		No. 2		No. 8/9				Total Tons All Grades		Total Realization		Average Per Ton Realizn.		Division of Tonnage as to Deliveries			Per cent Int. Lines
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	1	2	3	
1																				
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Your percentage total tonage..... .. ... . .tons at ..... tons at..
" " " realization..... ....tons at... .....tons at.....
A denotes inside, B denotes outside. .....tons at.... .....tonsat....

Summary Report, made out at Association office from above reports

Results in Cost Accounting

If one producer can put material on the market cheaper than another there is a reason. Such being the case, each producer is anxious to find that reason, and to find it one must resort to rigid cost analysis. The association wants the producers to inform themselves by cost accounting just what the cost of a yard of gravel is, and if possible, how this cost may be reduced.

Considerable time and thought are being devoted to establishing a satisfactory uniform cost accounting system for all producers. Such a system will enable a better discussion of costs, for then all producers will be talking from a common basis.

The success of the association may be indicated by the fact that it represents approximately 98 per cent of the tonnage produced in the Chicago district.

The executive committee at present consists of G. P. Longwell, chairman; F. E. Lane, A. Y. Reed and J. M. Northmore. Ben Stone is the executive secretary.

Silica Rock and Sand for Glass Making

Limiting Amounts of Impurities, Size of Grains, etc., for Different Grades and Kinds of Glass

By F. Gelstharp
Chief Chemist, Pittsburgh Plate Glass Co.

ORDINARY GLASS contains 65 to 75 per cent of silica. It is introduced together with the other raw materials in the form of sand.

The supply of glass melting sand may be obtained from, (1) wind or water deposits of sand, which is composed of loose separate grains of quartz, by simply digging, washing and drying; (2) both soft and hard sandstone rock, which is composed of a loosely cemented or consolidated mass of quartz grains, by quarrying, crushing, washing and drying; (3) quartz or silica rock, which is the most compact form of crystallized silica, by quarrying, crushing and screening.

Chemical Purity

The chemical purity of sand demanded depends entirely on the kind or grade of glass required. The following chemical and physical analyses are of satisfactory sands which are used for the ordinary pale green and better grades of glass. (For dark bottle glass more impure sands may be used):

	1	2	3	4	5	6	7
Silica	98.068	99.695	99.580	99.500	99.400	99.300	98.530
Oxide of Iron	0.019	0.025	0.040	0.045	0.090	0.109	0.180
Alumina	0.053	0.080	0.150	0.225	0.380	0.367	0.830
Lime	0.580	0.030	0.060	0.030	0.030	0.022	0.020
Magnesia	0.320	0.020	0.020	0.020	0.020	0.022	0.050
Loss on Ignition	0.960	0.150	0.150	0.180	0.180	0.180	0.390
Specific Gravity	.....	2.640	.....	2.638	.....	2.636	.....
Wt. per cu. ft. lbs.	.....	109.1	.....	97.6	.....	98.8	.....

Results of sieve tests made with Tyler's screens

	1	2	3	4	5	6	7
On 16-mesh (1.132 mm.)	*	.....	.....	.....	.....	*	.....
On 30-mesh (0.504 mm.)	*	20.3	5.0	3.2	*	1.4	0.9
On 60-mesh (0.221 mm.)	*	62.6	38.2	78.0	*	52.3	64.6
On 120-mesh (0.109 mm.)	*	14.6	53.0	16.3	*	45.4	30.0
Tailings	*	2.3	3.8	0.5	*	0.9	4.5

*Not examined.

Nos. 1, 2 and 3 are smooth, dense, rounded grains, practically colorless. Nos. 4, 5, 6 and 7 are rough, fractured grains, some being slightly colored by iron in No. 4. Nos. 5, 6 and 7 are very similar in appearance except that they contain more of the colored grains.

For the better kinds of glass it is of prime importance that the melting sand be of the greatest purity, as any iron it contains contributes so largely to the color of the resulting glass.

Common Impurities

Iron oxide is the chief offender on account of its strong coloring property. Metallic iron may be introduced in the grinding of silica or quartz rock and hard sandstone rock; this, of course, is just as damaging as the oxide and it is common practice where high grade glass is required for the glass maker to pass the sand over a magnetic separator to remove metallic iron, which will also remove any free magnetic oxide of iron.

Alumina should not be present except in small quantity. Iron is generally high when there is a considerable amount of alumina present.

If a properly crushed sandstone is well washed the alumina originally present as clay will be removed and if analysis shows considerable alumina still remaining, it is either present in a very objectionable form combined with either silica, iron, magnesia or lime, or a mixture of these which is not readily soluble, or it may be present as felspar, which is soluble and generally harmless. To be safe, therefore, the glass maker prefers to look suspiciously on a washed sand which contains much alumina.

It is often pathetic to have to listen to the claim of a sand producer that his product contains a very high percentage of silica and therefore a very high grade material. The high percentage of silica only means that he has a silica sand. The apparently small amount of impurities present may cause it to be entirely unsuitable for many kinds of glass.

Lime and magnesia are generally present in such small amounts in most glass sands that no trouble is experienced by their presence.

Many sands contain some titanium oxide, but it is not likely to be present in quantity sufficient to cause trouble.

Some sands are contaminated by decay of vegetation, but after washing there is nothing but a stain left which can cause no trouble. The necessity of very thorough washing should be fully appreciated by the sand producer, for the benefit of the glass maker.

Size of Grain

It has been found that large grains exceeding those which will pass a 16-mesh screen are undesirable; also the smaller grains which will pass a 120-mesh screen. The large solid grains of sand are slow in melting and may leave "strings" or "striae" in the glass. Such grains resulting from crushed sandstone are generally composed of a number of smaller grains cemented together and may be very easily broken down with slight pressure, and are not likely to leave "strings" or "striae," but still they are objected to on account of the fact that the material which cements the small grains together is usually an objectionable impurity. The fine grains which pass a 120-mesh screen are not objectionable, if they are as pure as the aggregate, but we usually find that this portion of a sample of sand contains much more impurity than the portion that is left on screens, between 16 and 120-mesh.

The most desirable glass melting sands are those which give the largest amount passing a 40 and remaining on an 80-mesh screen.

A very fine grained sand which will pass 100-mesh can not be used satisfactorily for glass melting unless particular care is exercised to make a most perfect mixture with the other materials of the glass batch, and the rate of melting must not be pushed, as such material is easily blown out or carried off with the gases evolved during melting. If the mixing is not thorough or the melting improperly carried out, "white knots" composed of

small and large balls of fritted silica are left in the glass.

When glass is melted in pots, sand or silica finer than 100-mesh is generally found to be too light or bulky to be of value as it is impracticable to obtain full pots in the regular time of melting.

Why Fine Sand Is Undesirable

Contrary to the expectation from what has been stated by the writer, in a previous issue of this journal, regarding the use of fine ground limestone, the melting time is longer when a fine grained sand is used. This might be explained by the fact that the heat conductivity of the glass batch is lowered to a very much greater extent than can possibly be caused by using fine ground limestone, due, of course, to the relatively much larger proportion of sand used in the glass batch (about 60 per cent of the mixture). Although finely divided sand is more readily attacked and dissolved by the soda and lime, or other flux, the commencement of this action is delayed by the lowering of the heat conductivity of the raw batch, and therefore tends to nullify any advantage of fineness. But in the case of finely ground limestone its effect in decreasing the heat conductivity is greatly overbalanced by the more active fluxing action, due to the greater surface of lime exposed to the sand.

This may be more clearly understood by viewing the situation as a particle of limestone surrounded by particles of sand of similar size; fusion takes place at the surface, producing an envelope of saturated silicate of lime; further action ceases until this envelope is made fluid enough by the sodium silicate (which is also being formed in the melt) so that other grains of sand can again come in contact with the lime particle. Now even if the sand grains were very much smaller, this action could not proceed much faster; but if we have the reverse condition where the limestone is finely ground, the number of successive envelopes, which must be removed before the particle entirely disappears, will be directly in proportion to its original size. Therefore, it is very evident why the effect of finer limestone is very different to that of finer sand.

Limiting Amounts of Impurities

Referring to the purity of sands required for the different grades of glass. An iron content of 0.025 per cent seems to be about the limit for optical, including spectacle glass; 0.050 per cent should be considered the limit for the better grade of flint and soda lime glasses for pressed and blown ware; 0.100 per cent is considered the limit for plate glass and pale bottles; and 0.200 per cent for window glass. For common dark bottles the iron may run as high as 0.500 per cent.

Who Shall Increase Rates?

Director Hines and Railway Body Each Wants Other to Act—Need for Raise Accepted

JUST WHERE FREIGHT RATES are going, and when, is as much a question as ever, although it seems to be accepted by the Government that they are going up. Following Director Hines' statement that the Railroad Administration was not in a position to increase freight rates before the termination of Federal control, and his proposal to the carriers that each individual road should file its own tariff, the Association of Railway Executives decided not to accept the Director's suggestion, but instead passed a resolution urging reconsideration of his refusal to announce higher rates.

Big Increase Needed

According to estimates made some time ago, when the earnings of the railroads were proving entirely inadequate, a general increase in rates of at least 30 or 35 per cent was absolutely necessary. Later reports of income have been more encouraging, but it must be remembered that the full force of the wage increase has not yet been shown in the monthly reports, nor is there much question that maintenance has been inadequate, to say nothing of the lack of capital expenditure during the period of Government control. Perhaps a 25 per cent increase would be sufficient, but the exact amount needed can be only roughly estimated at this time.

Hold Government Should Announce Increase

Since greatly increased operating expenses have come since the railroads were taken over, there are many who feel that it would be only fair for the administration to announce a further increase in freight rates, to offset those expenses, and at the same time bear the burden of the opposition that will surely come to such an advance. Returning the railroads to their owners with an income that is entirely insufficient and with the only recourse the resort to the old, time-consuming plan of filing tariffs with the Interstate Commerce Commission, is held to be entirely at variance with the announced intention of the President when the roads were taken over to safeguard the interests of investors in railroad securities.

Resolutions Adopted by Railway Executives

At the meeting this week of the Association of Railway Executives these resolutions were adopted:

1. That the Association of Railway Executives respectfully insists that the duty rests upon the Government to restore, on its own initiative and by its own action, the relationship between revenues and expenses which the Government's action, in increasing expenses, has disturbed; and that appropriate action in this direction is necessary in order to be in conformity with the statement of the President, when the railroads were taken over by the Government, that investors in railroad securities might rest assured that their rights and interests would be as scrupulously looked after by the Government as they could be by the directors of the several railway systems.
2. That a committee be appointed by the chairman, of which he shall be chairman, to take such action as it may consider appropriate to secure a reconsideration of the conclusion of the Director General as stated in the letter above referred to, and to take such other action as they may deem necessary in order to protect the interests of the railroads in regard to rates to be effective after the end of Federal control.—From the Bulletin of the Associated General Contractors of America.

Every Reader Can Help!

The drastic order prohibiting cars for crushed stone, sand and gravel hits the whole country—road work, bridges, street improvement, home building, and all building. Quarries and gravel pits employing half a million wage earners, are vitally affected and hit, at the threshold of winter. Thousands of miles of uncompleted roads and streets will menace public welfare the entire winter long, unless this order can be modified. The entire country is making a plea to have the order changed so as to allow at least 50 per cent car service for stone and gravel. The entire nation will applaud any man who comes to the front with a strong policy that will prevent a few trouble-makers putting handcuffs on 100 million people.

Don't let this be a repetition of the Garfield war order tragedy (Priority Order No. 2). The war is over.—A. P. SANDES, SEC'Y, National Crushed Stone Ass'n.

Late Developments in Newly Reorganized Lime Association

Weekly Meetings of a Staff Committee to Carry on Business—Eastern Bureau of Lime Association Organized—Agricultural Bureau Active

PRESIDENT WARNER spent Wednesday, the 8th, at the offices of the Association in conference with the secretary and department heads. In view of the fact that there is not now a general manager of the Association to decide a great many matters which must naturally be assumed by that office, it was decided at the meeting of Wednesday that such matters will be handled, at least until the new Board of Directors sits, by a staff committee, composed of the President, Secretary, Director of the Agricultural Bureau and the Director of the Chemical Bureau. This committee will hold weekly meetings on Wednesdays to discuss thoroughly all matters of importance to the conduct of the Association.

In line with action taken at the October 1st meeting of lime manufacturers, in relieving the national staff of detailed field work, the Bi-Weekly Prospect Bulletin, issued formerly by the Construction Bureau, will be discontinued until suitable arrangements can be made for properly putting prospective tonnage information before manufacturers, through co-operative arrangement between the national and district staffs.

Eastern Bureau of Lime Association Organized

On Wednesday, October 8, member companies in Districts Nos. 1 and 2, met in New York for the purpose of permanent organization, in accordance with the plans as outlined at the general meeting of October 1, for the creation of district offices. A tentative plan for continuing their work was outlined and considered.

It was decided to organize and operate under the name of the Eastern Bureau of the National Lime Association, and Henry M. Camp was elected Director of the Bureau. It was suggested that two classes of dues prevail for the support of the Eastern Bureau, namely, fixed and special dues. The former will provide for established overhead expenses and the latter will take care of special technical and field service, etc. The overhead dues have been fixed at 2½ cents per ton, subject to definite decision by the individual districts.

Other Districts Active

The members in District No. 5 held a meeting in Cleveland, Ohio, October 10 and elected Henry Angel, of the Kelley Island Lime and Transport Co., and A. H. Lauman, of the National Mortar and Supply Co., directors of the National Association.

Harvey S. Owen, formerly Western district engineer of the Lime Association, is doing important promotional work in District No. 7 and his expenses during the month of October have been underwritten by manufacturers in that district.

On October 14 the members of District No. 2 met in Baltimore, Md., and adopted a constitution and by-laws. Permanent fixed and special dues of 5 cents per ton each were adopted to meet the budget prepared. An advisory committee composed of representatives of all the member companies was elected. The following three directors of the National Lime Association were also elected: E. A. Grove, of the M. T. Grove Lime Co.; J. L. Durnell, of the Knickerbocker Lime Co., and C. C. Bye, of the Charles Warner Co.

The services of T. B. Shertzer, formerly Eastern district engineer of the National Association, were taken over by the District No. 2 organization, effective November 1. Mr. Shertzer is in New York State at the present time, doing important promotional work with the State Highway Department, and in order to have this work go on uninterruptedly until such time as his services with the Eastern Bureau become effective, his expenses for the month of October have been underwritten by some of the manufacturers in District No. 2.

The member companies in District No. 1 are meeting in New York as this issue of ROCK PRODUCTS goes to press. It is expected that this district will adopt a similar program, as all the work of both districts will be directed from one office by Mr. Camp.

Organization of National Boards of Directors

At the conference of the Staff Committee, Wednesday, the following individuals were appointed by President Warner to accept the responsibility for calling a meeting of the manufacturers in the districts mentioned for the purpose of permanent organization: District No. 3, J. King McLanahan, Jr.; No. 4, W. E. Carson; No. 5, Henry Angel; No. 6, Morgan Curtis; No. 7, Bernard L. McNulty; No. 8, R. C. Brown; No. 9, B. F. Pay; No. 10, J. M. Gager; No. 11, F. C. Cheney; No. 12, J. F. Pollack; No. 13, H. Dittlinger; No. 14, J. S. McMillin.

The purpose of these district meetings will be to elect permanent directors to represent each district and to organize permanently for the purpose of supplementing the activities of the national staff and the collection of data and in the application of the materials supplied by the national staff in intensive local work for the development of a larger lime tonnage.

A special letter from the president has been sent to each of the above-mentioned manufacturers, asking that these meetings be held not later than October 30th. —National Lime Association Weekly Letter.

Whipple to Leave National Lime Association

ALLEN D. WHIPPLE, whose work as director of the chemical bureau of the Lime Association has given him a national reputation, has resigned from the staff of the Association, effective November 1. His new connection is not yet announced.

Mr. Whipple came to the Lime Association about a year ago from the Portland Cement Association.

New Idaho Lime Producer

THE CRYSTAL LIME CO., Limited, Lewiston, Idaho, which has recently been incorporated with $100,000 capital, is introducing the manufacture of lime into a new territory.

The new plant will be located at Oro Fino, 42 miles southeast of Lewiston on the Clearwater River and a branch line of the N. P. R. R. The articles of incorporation state that the company will produce hydrated lime, lump lime, agricultural lime, terrazza, and later, after the organization is complete, commercial marble will be added. It is stated that the corporation owns a large tract of limestone property.

The incorporators of the new company are: B. L. Schultz, President; Eliot Richardson, Vice-President; E. G. MacFarlane, Secretary and Treasurer. The main office is at Lewiston, Idaho.

How Deep Quarry in Chicago is Drained

Union Lime Co. Quarry Uses a Four-Stage Centrifugal Pump to Elevate Water From Its Quarry Floor

THE CHICAGO UNION LIME CO., at 1900 W. 19th St., Chicago, is an example of one of the deepest open quarry pits in this country. Owing to the limitation of the property, this quarry has resorted to depth instead of broadening out. Being so situated in the city proper that the acquiring of further area is prohibitory because of property value and location the quarry has been worked to a depth of 320 ft. and before being abandoned will go below 400 ft., according to Geo. E. Lawton, who is secretary of the company. The quarry proper is 650 ft. long and 250 ft. wide and since its opening in 1859, 2,500,000 cu. yds. of material have been removed. At this point of the earth, the underlying strata of rock has raised to cause an out croping. The walls are vertical for practically the entire distance of 320 ft., displaying a very even surface, which may be seen in the pictures.

The quarry is operated by removing the stone in layers of 40 ft. It requires seven years to remove such a layer. It has been estimated that the rock extends about 1100 ft. down, but it is believed that the cost of elevating will not justify going over 100 ft. farther. After attaining this depth the quarry will be converted into a refuse disposal dump for Chicago and will thus become a source of further wealth to its stockholders.

One of the ever increasing difficulties of this deep quarrying has been the problem of drainage—the only solution being by the use of a pump. The plant at present is operating its second installation, the first installation having become unable to pump the required amount under the increased head. At present the drainage is effected by the use of a sump hole and a centrifugal pump.

The problem of sinking the sump hole is of unusual interest. Considerable study was given the subject and finally the following method was decided upon to great advantage. The sump is circular and of about 14 ft. diameter. A number of holes were drilled on the circumference, being fingered in at the bottom in a basket shape. The charge was calculated and placed properly. When it was fired it cleaned the hole entirely—the fragments being blown as high as 200 ft. and were so broken as to require no further breaking in the quarry. The sump has a capacity of 120,000 gal.

A multi-stage single suction pump takes suction in this sump through a 4-in. pipe. It has a capacity of 400 g. p. m., from a suction of 10 ft. and a head of 340 ft., being driven by a 75 h. p. direct connected three-phase 440-volt motor at 1750 r. p. m. The pump is operated three hours per day and a very dry floor is thus maintained at all times.

In cost accounting, it is figured that drainage costs 1.35 cents per cu. yd. of material quarried.

The Chicago Union Lime Co. has a capacity of 800 tons of crushed rock and 800 barrels of lime per day, the crushed stone being used for both road and building rock.

Left—Chicago Union Lime quarry, showing depth of working floor. Right—Showing sump, elevator shaft and quarry floor

Effect of the Co-Operative Movement on the Sale of Lime

Manufacturers' Relation to Movement for Collective Buying, Particularly by Agricultural Communities—The Protection of the Dealer

By John H. Voorhees
New York State College of Agriculture, Cornell University, Ithaca, N. Y.

LIVING CONDITIONS, business conditions, all conditions everywhere, from community to state and nation, are disturbed; they are in a turmoil. There is no calculable basis for procedure in business or any other line of endeavor. Different degrees of the high cost of living have been the topic of discussion on the street corner and in the home for ten years. Now, too, there is the high cost of doing business.

If the high cost of living is caused by evil practices little has been done to correct them, but gradually developments bring about attempts of one kind or another. The co-operative movement, which has been started quite vigorously in some countries, is one of these. Every one knows of the successful and extensive associations in England under which wholesale and retail distribution of goods is carried on by co-operative societies.

The British co-operative societies now do a business of about a billion dollars a year and save their members about one hundred million dollars. In the United States there are nearly 2,500 consumers' co-operative associations, and the number is growing rapidly. In fact, the number of such organizations has tripled in the last two years. It would not be at all astonishing if one method of relief from economic distress and the evil of excessive profits for middlemen may ultimately be found in just this direction of intelligent, mutual business helpfulness of consumers by consumers and for consumers.

The co-operative movement has already secured a strong foothold in industrial centers, mining camps and cities. Generally, all great movements start in centers where people have easy intercourse and extend to the smaller communities and finally to rural districts. This movement is no different from any other great movement, and as time goes on co-operation will develop more vigorously in the country in proportion to its success in thickly populated centers.

Farmer Associations

There is much agitation at the present time to make it possible and lawful for farmers to combine for the purpose of collective bargaining. Many states have already passed laws to improve and clarify the status of collective bargaining of farmers. Mr. Hersman, representative from California, has recently introduced a bill, H. R. 7783, "to supplement existing laws against unlawful restraints and monopolies and for other purposes." This bill is designed to allow farmers the combine for collective sales without fear of prosecution. Part of it reads as follows:

That the labor of a human being is not a commodity or article of commerce. Nothing contained in the anti-trust laws shall be construed to forbid the existence and operation of labor, agricultural, vineyardists, dairy or horticultural organizations, instituted for the purposes of mutual help, and that pays annually no greater dividends on stocks or membership capital investment than the minimum legal rate of interest of the state where organized, or to forbid or restrain individual members of such organizations from lawfully carrying out the legitimate objects thereof; nor shall such organizations be held or construed to be illegal combinations or conspiracies in restraint of trade or commerce under the anti-trust laws.

Associations, corporate or otherwise, with or without capital stock, of farmers, vineyardists, horticulturists, planters, ranchmen, or dairymen engaged in making collective sales for their members or shareholders of farm, orchard, plantation, ranch, dairy, or vineyard products produced by their members or shareholders are not contracts, combinations, or conspiracies in restraint of trade or commerce.

That this bill, Senator Capper's bill, or some other similar bill, will be enacted into law seems most likely because as previously stated the individual states are, one after another, showing a favorable disposition toward such legislation by similar individual action. Such states as Illinois and New York are already committed to such action. Governor Lowden recently said at the time of signing the Illinois State act: "The policy expressed in this bill, in my opinion, is sound. To deprive the farmers of the right of collective bargaining is to deprive them, in effect, of all right of bargaining. If the individual farmer must act alone in the sale of his products, he is compelled to take whatever price is offered. He, therefore, is not in a position to deal equally with great concerns with which he must do business. The farmer is dealing largely with the product of his own toil. Therefore, to admit the principle of collective bargaining as applied to men employed in other industries and to deny it to the farmer is unjust discrimination."

State Colleges of Agriculture and State Departments of Agriculture are also active in assisting farmers to organize. Some individuals almost proceed to the point of propaganda, but this has been found dangerous and the amount of it is rapidly decreasing. The Department of Rural Economics of the New York State College of Agriculture makes the following statement: "The policy of the college toward co-operative organizations among farmers, based on self-help, is to encourage the formation of such enterprises wherever needed. This department is ready to render advice and direct personal aid in organizing such new associations whenever needed, in strengthening old associations that are in trouble, in helping install correct accounting systems, and doing follow-up work with needy associations."

Difficulties in the Way of Successful Organization

It may be noted that every possible step is being taken to assist the farmer to develop organizations, but the organization of farmers is not as easily accomplished as it may appear. There are a number of conditions pertinent to success. First of all, a farmers' organization must be the child of necessity, its individual members must be absolutely unselfish, there must be good leadership and a conspicuous absence of jealousy; there must be loyalty, efficient management, a volume of business, it must be mutual and afford the same benefits to all, it must have liberal capital, and wherever possible there must be a rapid turn-over of capital accomplished by a cash-with-order plan.

To any one familiar with the farmer and his methods of doing business it is clear that even today there are many organizations among farmers which are not sound, organizations which cannot live. It must be clear how slowly this movement can be expected to proceed and how few communities there are where the volume of trade is sufficient to maintain efficient management. But

in spite of the many obstacles there are today numerous successful organizations among farmers and the movement is progressing rapidly.

Where the Lime Producer Comes In

History appears to show that most co-operatives among farmers are started for the purpose of selling collectively some one product or group of products, and the purchase of supplies follows as a subsequent development. Wherever this is the case the manufacturer of lime or any other product used by farmers may well realize that such a concern is firmly established and is to be reckoned with. Hence, following the development of co-operatives for selling will come purchasing, because the one is the logical outcome of the other. Selling is often a seasonal occupation, whereas buying is continuous and especially diligent in winter when there is little, if any, produce to sell except in the case of milk, butter, eggs and the like. It is logical to utilize this time for the purchase of farm supplies.

The relation of the manufacturer of farm supplies, lime, fertilizers, machinery and the like, to the farmer during the period of agricultural co-operative development is bound to be unsettled to some extent. So far as the use of lime is concerned there is no question about it. A healthy organization should stimulate its use, but the zeal of many organizations to benefit their members is often shown by an unwise and unwarranted search for a cheap material in order to save money. In some cases this is manifested by the purchase of an inferior product, and in others by the development of some local quarry by a small grinding machine. In either case the successes and failures will in time be reflected in the sales of lime of companies manufacturing a strictly high-grade product.

Such organizations, however, may not be expected to lighten the burden of the lime manufacturers. It will be quite necessary for them to maintain a wholesome and honest advertising campaign, and because such organizations are very likely to be guided somewhat by the college or department of agriculture which has fostered them it will be necessary for lime manufacturers to maintain pleasant and agreeable co-operation with these colleges and departments.

It is my opinion that the Morrill Act creating state colleges and agricultural experiment stations, and possibly the Hatch and Adams Acts, supplemental thereto, were intended to protect the farmer by the elimination of inferior products of commerce. It may be argued that the police laws of the several states and the federal government are for this purpose. This is undoubtedly true, but these laws are valueless without a definite knowledge of the various products of commerce and their action in relation to agriculture. Would not a department of commercial relations at each college and experiment station to study the character and value of such products, a department to deal with the differences of manufacturer, experiment station worker and farmer, be a very valuable asset to the farmer and to the manufacturer?

The Dealer Problem

That the trade of the individual manufacturer will be affected during the period of development is undoubtedly true, but it will be adjusted in time, and each will secure a proportionate share according to the energy expended and the character of his product. The greatest problem will come from the protection of dealers. It is not likely that any large proportion of lime will be purchased through co-operatives for years to come, but in the meantime each co-operative will be a disturbing element if the dealer insists on protection.

On the other hand, however, the profits to the dealer in handling lime in terms of percentage are so small that little trouble may be expected from him. On the whole, the co-operative will undoubtedly improve the lime trade because it will enable farmers to bulk their orders more easily and secure the amount that is needed with less difficulty, and there is no question but that the large volume of trade today lies in the less than carload lot which the dealer or co-operative handles and which is not apparent to the manufacturer.

In concluding, the co-operative will ultimately be a large factor in increasing the use of lime. It will help to advertise, it will bulk small orders, it will enable every farmer in a community to secure his requirements at the time when he needs them, and it will help to distribute the trade throughout the year. On the other hand, there will be a tendency to seek cheap materials and develop local sources of supply. Because the commission is less on concentrated forms, it will be likely to improve their sales. Purchases will undoubtedly be based on the cost of oxides contained in any form, but for a time at least the fineness of division and the cost of available oxides is likely to be overlooked in the zeal to purchase cheaply for the members. There will be some disturbance among dealers which will be primarily an individual problem and undoubtedly more serious in the case of ground limestone, where the dealer's commission is proportionately greater.

Talc and Soapstone Production

FROM PRELIMINARY figures reported by the Geological Survey, it seems that the total quantity of talc produced in 1918 in the United States was less than that produced in 1916 or 1917, but the total value was greater.

At the same time, the imports were also less, so that the total domestic consumption shows an apparent decrease for 1918. However, the decrease is comparatively small, and does not indicate any serious decline in the popular use of talc. 1916 and 1917 were war years, during which English clay, the greatest competitor of domestic talc in the paper trade, was expensive and at times difficult to obtain.

This created an abnormal market for talc and it is natural that, with the increase of shipping in 1918, and consequent greater availability of English clay, a portion of the new business would be lost. The 1918 production, however, was over 26,000 tons larger than that of 1915.

The imports of ground or manufactured talc for July, 1918, were 1,147.3 tons, valued at $19,530, and for July, 1919, were 1,281 tons, valued at $28,381.

The production of high-grade talc in California is becoming increasingly important, the 1918 production being over twice that of 1917. According to figures from the California State Mining Bureau, the 1917 production of talc and soapstone in California was 5,267 tons, and that of 1918 was 11,760 tons.

A bill to increase the present import tariff on talc has been introduced into the House of Representatives by Congressman Fordney, Chairman of the Ways and Means Committee of the House. The principal provisions of this bill are as follows: Talc, steatite, soapstone, and French chalk, crude and unground, ½c per pound; when ground, washed, pulverized, or powdered, 1c per pound; when cut or sawed, or in the form of blanks, crayons, or cubes, 2c per pound; and 50 per cent ad valorem on manufacturers of talc, talcum, steatite, soapstone, and French chalk, wholly or partly manufactured, if not decorated; if decorated, 60 per cent ad valorem.

The present tariff on talc and soapstone admits crude and unground material, free of duty; talc or steatite, cut, powdered, washed, or pulverized, 15 per cent ad valorem.

Building in Chicago Active

RESUMPTION of construction activities in Chicago and Cook County continues to increase. Reliable figures show work in prospect valued at more than $14,000,000; during September almost $7,000,000 worth of construction was started in Cook County. Right now there is a lively scramble among contractors for materials and labor. Cement stocks have been depleted, both as to warehouses and mills, and the great shortage of open-top cars has made it impossible to supply the demand for sand, gravel and stone.

Recent Work in Rock Products Field by United States Bureau of Standards

New Fire Tests of Reinforced-Concrete Columns—Protected Gravel Concrete Better Than Unprotected Stone Concrete—Porosity Tests of Limestone—Quick-Setting Cements

WASHINGTON, D. C.—The following report of work being done at the Bureau of Standards in the testing and investigation of cement, concrete and allied materials, has just been secured from the bureau by the Washington Bureau of ROCK PRODUCTS:

Twenty-eight full size columns of reinforced concrete have been constructed; 25 have been subjected to the combined fire and load test, and 7 have been tested cold, in compression. The work done has been twofold in nature, and consists, first, of making and testing full size building columns of reinforced concrete from aggregates not previously included; and, second, in making and testing columns with protective material other than concrete. It has been found that columns made from the so-called Cow Bay gravel, a mixed gravel containing a large proportion of granite and gneiss pebbles, and columns made from pure quartz gravel gave results not quite so good as the columns made from Pittsburgh gravel previously tested. In the later column tests, the protective concrete spalled so badly early in the fire test that a large part of the protective covering, after breaking up into slabs, fell away from the column, exposing the steel and the load-bearing concrete to the fire. These columns failed under their working load before the completion of the four-hour test. On the other hand, columns in which the coarse aggregate was trap rock showed no tendency to spall or crack seriously in the fire tests and retained more than half of their original strength as determined by load tests made while the columns were at maximum temperatures at the end of the four-hour fire test. The results shown by columns in which the coarse aggregate was blast furnace slag were similar to those with trap rock aggregate.

Gypsum Plaster Protection

Since it has been found that concrete columns using gravels of three different types show much less resistance to fire than columns of limestone, trap rock, or blast furnace slag, an effort has been made to develop practical methods whereby columns from gravels of these types, which are in very extensive use, can be so protected as to resist fire as well as, or better than, columns from the other aggregates, without any additional cost of construction. In order to do away with the excessive cost of steel or wood forms, columns have been cast in gypsum forms which are also allowed to stay in place as a protection against fire. Forms of this style, with a light binder of expanded metal or of poultry netting, have been found to stay in place throughout the four-hour fire test and to afford excellent protection. Gravel concrete columns so protected withstood the test much better than trap rock and slag concrete columns made in the usual way. It has been found that columns can be made without the usual steel or wood forms by wrapping metal lath around the spiral reinforcing steel and casting the concrete in that. The results indicate that no great difficulty should be experienced in making columns in this way, if concrete of medium consistency is used.

Cement Coating Not So Satisfactory

Several columns have been made and tested in which a part of the protective covering has been formed of plaster made of portland cement and sand. These columns gave better results than gravel concrete columns from the same aggregate made in the usual way, but not as good as those made from trap rock and slag. The difficulty with this form of protection is that the outer coat or coats of plaster fall off under fire conditions, leaving the column with insufficient protection,

Considerable work has been done in the study of plasters for the protection of gravel concrete columns and for other purposes. It has been found that within certain limits mixtures of gypsum, hydrated lime, and kieselguhr give workable plasters of superior heat insulating properties. One column, which had been cast in expanded metal over spiral reinforcement, was covered with approximately 1 in. of a mixture of these materials. Poultry netting was placed over the second coat, and concealed by a third coat. A finish coat of gypsum and hydrated lime was used. In the fire test, only the finish coat came off. The total thickness of protective material on this column was approximately 2½ in., and the thermal protection was so effective that the higher temperature measured in the steel was but 185 degrees C., as against 410 degrees C. in the steel columns protected by 2½ in. of material in the form of concrete covered by cement plaster.

Porosity Tests of Limestone and Sandstone

A number of porosity and compression tests are being made on standard specimens of Indiana limestone. These tests are to establish further data for the preparation of specifications for this material, and to furnish a more definite basis for the grading of this stone. To date, 72 porosity determinations have been made and 30 compression tests completed.

A number of panels of different grades of Indiana limestone are being erected in a position where they will be exposed to the weather. These panels are approximately three feet square and consist of a four-inch facing of limestone and a brick backing. Various mortars and different methods of waterproofing will be used in setting up the panels. The object of this experiment is to determine the cause of the discolorations which are so frequently seen in structures built of this material.

Freezing tests have been made on 15 samples of commercial sandstone. Several of these withstood 300 freezings with but few signs of disintegration, while the poorer grades were completely broken down by less than 100 freezings. One sample of granite passed 300 freezings without showing any signs of frost action, while a sample of porous limestone began to disintegrate at 150 freezings.

Three freshly quarried slabs of marbles were accurately measured and then exposed to the weather on the roof of one of the bureau's buildings. These tests were started last March and are to determine the effect of such exposure on the dimensions of the pieces. A considerable change of dimensions was shown by all slabs during the first three months, after which the dimensions remained fairly constant. Two slabs of Tennessee marble expanded; one 0.02 per cent and the other 0.13 per cent of its length. A slab of Vermont marble contracted 0.04 per cent of its length.

Quick-Setting Cements

In view of the favorable results obtained in the preliminary tests on Cal as an accelerator of the hardening of portland cement mixtures, it was considered desirable to make further tests in concrete, and, at the same time, to make parallel tests, using calcium chloride as the accelerator.

The outline of the tests requires the making of 324 six by twelve inch cylinder test pieces, one-third of which are to be broken at each period, 2 days, 7 days, and 28 days. The proportions are 1:1½:3 and 1:2:4. All mixes of each proportion are of the same consistency. That of the first is rather stiff, while that of the last is considerably wetter, thus the ranges of proportions and consistencies of mixes in which an accelerator is apt to be used are fairly well covered. In order to study the effects of the accelerators on different brands of cement, identical tests were made on three brands. With each cement and proportion, three percentages of accelerator were used, 0 per cent, 5 per cent Cal, and a percentage of calcium chloride solution containing an equivalent amount of chlorine, as in the 5 per cent Cal. These percentages are on the basis of the weight of the cement. The test pieces from each batch were divided for storing in damp sand and air, enabling comparisons of two storages.

Incidental to the tests, time of set determinations on accelerated and unaccelerated concretes, using the flow table method, were made, and it was found that the accelerated concretes reached the point of no flow or set at an earlier time than the unaccelerated concretes.

At the present time, progress in the tests has been made to the extent that all test pieces have been molded and a considerable number have been broken. However, no conclusions can be formed from the data on hand at this time.

Striking Quarrymen Get Fifty-Five Cents per Hour

QUINCY, Mass.—The quarrymen's strike in this city was settled, according to local report, by the acceptance of the quarrymen of the so-called Montpelier, Vt., agreement. The new minimum wage will be 55 cents an hour till November 1, when there will be an increase of 2 cents.

On January 1 there will be an additional increase of 3 cents. Further similar increases are provided for until the expiration of this wage agreement April 1, 1921.

Several hundred men in Quincy were affected by the strike. The new scale of prices was decided on at a meeting held recently in Montpelier by the executive committees of the quarry owners and quarry workers.

Bruce Mine Quarries

BRUCE MINES QUARRIES, Ontario, were opened years ago when contractors from Cleveland began quarrying the trap rock by hand and hauling it in barges to Cleveland, there to be crushed and put on to the boulevards. Later this stone was used by contractors to construct the mammoth new locks at Sault Ste. Marie, Mich. Later, the property was purchased and developed by the Martin International Trap Rock Co., of which S. B. Martin was the head.

Recently the Bruce Mines Trap Rock Company, Limited, was organized by the bondholders and creditors of the Martin International Trap Rock Co. It has a paid-in capital of $150,000 and an outstanding issue of $250,000 of income bonds.

The company's plant is located on the Bruce Mines Harbor, Bruce Mines, Ontario, which is on the north shore of Georgian Bay. The company has an unlimited supply of first-class trap rock, and has a daily production of 4,000 tons of rock in various sizes.

The principal market for this product has been the cities of Detroit, Cleveland, Chicago and other Great Lakes cities. On account of water transportation, it is able to compete with local materials.

W. S. Edwards is president and general manager, and Perry E. Wurst is secretary of the new company.

Will Try to Get Modification of Open Top Car Order

MR. E. GUY SUTTON has gone to Washington, D. C., for the purpose of trying to bring about a modification of the order which has recently been sent out directing that all open top cars be sent to the coal mines in anticipation of the coal miners' strike.

It is believed that the production of coal will not be increased by the crowding of the mines with cars.

A message received October 23, stating that he is informed by officials of the U. S. Railroad Administration that the recent order, diverting open-top cars to the mines, is not intended to deny other shippers cars when available in excess of the number that can be loaded expeditiously with coal; that cars are not to be used, either by the railroads or by the public, for storing coal, but must be unloaded promptly and kept moving; that he is endeavoring to obtain a modifying order and is hopeful of success.

Some of the railroads are placing an equitable interpretation on the recent order, and all producers are advised to urge their regional advisers and local railroad officials to make such interpretation.

Mr. Sutton will remain in Washington the rest of this week and will keep the Indianapolis office advised with reference to the situation. Further bulletins will be issued when information of value is received by the Indiana Sand and Gravel Producers' Association.

Sand and Gravel Producers Association Holds State Meetings

SECRETARY SUTTON of the National Sand and Gravel Producers Associations, held state meetings in Michigan, Minnesota, Iowa and Nebraska last week, in the interest of the national association. G. V. Miller, national treasurer, accompanied him to Michigan, and Mr. G. J. Nattkemper assisted at Des Moines, Iowa.

Would License Every One Handling Explosives

SENATOR NELSON'S proposed Federal legislation to regulate the manufacture, sale, purchase and use of explosives would add considerably to the quarryman's troubles. It requires the licensing of manufacturers, dealers, purchasers and foremen.

Among other things the proposed act provides: "That the superintendent, foreman, or other duly authorized employe at a mine, quarry, or other work, may, when licensed so to do, sell or issue to any workman under him such an amount of explosives or ingredients as may be required by that workman in the performance of his duties, and the workman may purchase or accept the explosives or ingredients so sold or issued, but the person so selling or issuing same shall see that any unused explosives or ingredients are returned, and that no explosives or ingredients are taken by the workman to any point not necessary.

Under the terms of the act the quarry foreman would be required to do a good deal more bookkeeping than the average man of that type is capable of. It is provided that: "From and after forty days after the passage and approval of this act every person authorized to sell, issue, or dispose of explosives shall keep a complete itemized and accurate record, showing each person to whom explosives are sold, given, bartered, or to whom or how otherwise disposed of, and the quantity and kind of explosives, and the date of each such sale, gift, barter, or other disposition; and this record shall be sworn to and furnished to the Commissioner of Internal Revenue, or his representatives, whenever requested."

These impractical provisions alone should insure the active opposition of all quarry operators. The bill is Senate Bill 2896, a copy of which may be obtained by addressing the secretary of the Senate at Washington, D. C.

National Lime Association Wants An Accurate Terminology of Lime

Summary of Proposed Definition and Uses of Terms of Great Importance to All Agricultural Lime and Limestone Producers

TO ANYONE WHO HAS had broad contact with the production and use of liming materials in the agricultural field, the confusion in the use of names and terms applied to these is distressingly apparent. It is a natural consequence of the intimate contact of the manufacturer and the chemist who have one viewpoint, with the farmer and the agricultural worker who have a different viewpoint. The present broad effort which is very well typified in the Agricultural Bureau of the National Lime Association, to harmonize these two viewpoints and to reduce them to a smooth working basis would seem to start with an agreement on the definition of terms. This agreement should as nearly as possible include present practice and where changes in definition may be necessary, these should conform to the dominant usage. To this end the Agricultural Bureau has been giving special attention to terms applied to liming materials and the necessity for general and group terms as well as specific terms.

In presenting a summary of proposed definitions and usage of terms at this time we do so first of all with the purpose to invite constructive criticism, and second, in order that the general promulgation of these terms as they may be revised, if necessary, may carry with it the weight of the opinion of both the manufacturer and the users of agricultural lime. Thereby, when coupled with the publicity the Lime Association is able to give these definitions, they should find general acceptance and should result in more accurate statements affecting the use of liming material, since all informed persons would use these essential words in the same sense. Any use of terms applied to lime materials in agriculture is likely to be dominated by the application of the materials to the soil.

Three classes of terms are recognized, namely:

a. General terms that include all kinds of liming materials suitable for use on the soil to correct acidity.

b. Group terms to cover the main divisions of lime materials which result from their inherent properties and their different actions in the soil.

c. Specific terms that identify particular materials.

A. General Terms. The value of a wide variety of lime-bearing materials to partially or wholly correct that condition of soil known as acidity is so widely recognized in agricultural science and practice that it may be accepted as an established fact. The several terms in general use in the agricultural field to identify in one thought all the materials suitable for that purpose are (1) Agricultural lime, (2) Liming materials, (3) Land lime, (4) Soil lime, (5) Liming, and (6) the word "lime" when used in a context to show that the use is a general one.

This general usage is very widely established in the agricultural bulletins relating to the use of liming materials in the soil and in the State laws regulating the sale of such materials.

The word lime may be regarded as having two definitions, depending upon the connection in which it is applied; namely, the general sense just defined and the narrow technical sense as represented in divisions 1 and 2 of group B below.

B. Group Terms. All suitable liming materials may be placed in two main groups.

The terms applicable to the first group are (a) burnt lime, or (b) caustic lime. This includes the oxide and hydrate forms of lime which have been formed by burning to drive off the carbon dioxide. All these materials also have caustic or free alkaline properties in the manufactured form. Either term may be used to identify this group.

Where weight is given to criticisms that have been aimed at caustic forms of lime due to wrong notions of its destructive effect on humus in the soil, the phrase burnt or burned lime will probably seem preferable for identifying this group.

The terms applicable to the second group are: (a) Carbonate lime, or (b) Lime carbonate.

This includes all raw or unburned forms of lime materials. The handling of these materials and their effects on the soil differ more or less from those in group one.

C. Specific Terms Applicable Only to Particular Materials. To several materials there are a number of names that seem to be equally applicable. The following main divisions are reorganized and are each of them subject to further division based upon their content of magnesium and upon differences in purity and physical condition. These distinctions may be represented by a further addition of standard terms if that should prove desirable. Differences in content of magnesia are already recognized in definitions adopted by the American Society of Testing Materials.

The specific names of lime materials are:

1. (a) Lump, (b) Stone, (c) Rock, (d) Oxide, and (e) Quicklime, applied to material freshly burned from lime carbonate.

2. (a) Ground lump, (b) Ground quicklime, and (c) Ground oxide. This is the crushed or pulverized form of number 1.

3. (a) Hydrated or (b) Water-slaked lime. This material results from any of the materials in division (1) and (2) when chemically united with the ele ments of water in such proportion as to form a fine dry powder.

4. By-product caustic limes. This may include a wide variety of materials, such as acetylene lime and other materials of a by-product character having substantial caustic properties.

5. Air-slaked lime. This results when any of the materials in the first four divisions are permitted to stand in natural contact with the atmosphere and are substantially changed into a carbonate form mingled with the oxide and hydrate forms. If completely air-slaked it would all be in the carbonate form.

6. (a) Pulverized, (b) Crushed, or (c) Ground limestone. Fineness should be further defined.

7. (a) Marl, natural soft lime carbonate. Wide range in purity. Fineness should be further defined.

8. (a) Pulverized, (b) Crushed, or (c) Ground mussel shells. Includes oyster shells, clam shells, etc. Fineness should be further defined.

9. By-product carbonates of lime. This may include a variety of lime materials that have substantially carbonate properties, such as acetone lime and the spent lime from tanneries.

10. We invite comments on this outline of definitions and grouping of lime materials through which we hope to establish a better understanding between the lime materials industry and the agricultural public.

CHARLES WARNER,
NORMAN G. HOUGH,
ELMER O. FIPPIN,
A. D. WHIPPLE,
Staff Committee, National Lime Ass'n.

Eastern Building Material Market Reported Active

New York to Have Active Winter—Shortage of Material Caused By Reduced Working Hours

WITH the clearing of the deadlock between the building artisan and his employer, the greater problem of finding available material with which to carry on new construction work during the coming winter and early spring is already beginning to absorb the attention of architects and contractors.

Building material manufacturers aver that the shortened standard of a day's work at the mills and kilns has already precluded any possibility that normally would have existed to accumulate a surplus supply for future market needs. This is said to be true of nearly every department in the building material field.

It simply means that hope must be abandoned for quick relief from the housing shortage. It also means that the upward tendency of the price of all building materials will be accentuated. Continued scarcity of new buildings will tend to increase rents still further next year.

As the situation now stands, the general construction market is headed toward commercial and industrial development, rather than toward residential building. More and more the holders of building materials, whether manufacturers or distributors are being forced to cater to the large buyer.

The foregoing applies to the East perhaps more than to the West or Middle West. Projected building work outside of the environs of New York, is extremely active and the condition of supply is not so lamentably low as it is in this vicinity. Nevertheless, the trend of prices is upward in almost every part of the country, for the most part reflecting the higher cost of the shortened working day and the nation-wide demand for new construction work.

Price activity was more pronounced in the supplementals department last week. In every department reporting there is a monotonous flavor of inability to catch up with orders, sharp declines in volume of production and the constant hitching up of prices of raw materials. This complaint is common also among basic building material manufacturers, but there is more stability to price levels in basic materials than in the list of supplementals. There are variations here and there.

Shipping schedules are much upset, and while deliveries were bad enough before, they are much worse at present, and before long it is feared a shortage will be reported, especially in the oil fields. Some of the mills have been able to continue operation, but the greater number has lost production, due to labor troubles. It does not now seem probable that mills will be interested in new business for some time.

The general building situation in New York and vicinity is preparing for an active winter. While the matters in issue between the employers and the employes are being ironed out, general preparations are under way for a big construction movement. Brick manufacturers have been taking advantage of the recent warm weather to operate their yards as near to capacity as the condition of labor supply will permit, while the contractors are coming to a realization that their next big problem after the labor situation clears will be to get supplies sufficient to meet their needs. The realization of this situation is responsible for the heavy pressure now being exerted by prospective builders of important commercial and industrial projects to book up material supply well into the future, at the best price they can get under the circumstances. —Dow Daily Service Report.

Italy's Demand for Phosphates

PRIOR TO THE WAR the demand in mineral phosphates for agricultural purposes in Italy was about 500,000 tons per year, valued approximately at 16,000,000 lire (1 lire equals 19.3 cents normal exchange rate). Phosphates were then and are now imported, principally from Tunis and Algiers (North African coast), the United States furnishing only a small share.

The imports of American phosphates dropped from an average of 75,000 tons per year before the war to 2,291 tons in 1916, 6,671 in 1917, and 1,449 in 1918, total imports in said years being 434,000, 230,000, and 231,000 tons, respectively. The importation of American phosphates into Italy was formerly exclusively controlled by German firms, while at present a number of Italian importers and consumers are in direct touch with producers in Florida and Tennessee.

With the present revival of agricultural activities, the demand for phosphates is considerable. The present shipping difficulties and high exchange rates, however, are seriously handicapping the exportation of American phosphates into Italy. There are many firms here willing to negotiate for shiploads of this product, but the chartering of a ship is a problem.

Notwithstanding the preferential freight rate granted by the United States Shipping Board Fleet Corporation for phosphates intended for Genoa and Trieste (viz., $28 per ton, instead of the usual rate of $40), the price of this commodity when delivered here is exceedingly high—$40 c. i. f. Genoa, which, at present exchange equals 360 lire per ton.

The American c. i. f. quotations are now prohibitive. It is believed, however, that if it were possible to load phosphates as ballast on steamers returning from American ports, or reduce the freight rate considerably, an extensive business between the two countries would certainly result.—American Consul, North Winship, Milan.

(A list of names of Milan concerns interested in the importation of phosphates may be secured from the Bureau of Foreign and Domestic Commerce or its district and cooperative offices. Refer to file No. 123359.)

Highway Building in Far West

OAKLAND, Calif.—With the object of co-ordinating all efforts in relation to State Highway construction in San Francisco, Mendocino, Lake, Napa, Solano, Sacramento, Sonoma and Marin counties, the United Counties Highway Association has been organized at Santa Rosa, California.

Four road projects are to be urged on the State Highway Commission. They are: 12 miles in Mendocino County, 26 miles from Santa Rosa to Shellville, giving the people there direct connection with San Francisco; highway in Lake County; 5 miles in Marin County.

The labor situation continues to be the source of much uneasiness to those engaged in street work or the operation of quarries about the Bay. However, the scarcity of housing facilities necessitates the erection of dwellings and apartment houses. Sacramento reports that the greatest building boom in the history of the city is under way.

Highway construction in practically all parts of the state is being seriously hampered and in some cases actually delayed by the shortage of freight cars.

The explanation is made that thousands of cars are now tied up in the movement of fruit. Realizing that the demands of the fruit men come first, highway officials are not persistent in their claims. As soon as the fruit season is over efforts will be made, it is said, to secure a material increase in the number of cars allotted for hauling road material.

NEW MACHINERY AND EQUIPMENT

An Electric Vibrating Screen

THE STIMPSON EQUIPMENT CO., Salt Lake City, Utah, has placed upon the market a brand-new idea by way of a Mitchell Electric Vibrating Screen.

The screen differs from other types in that the vibratory force is applied by a small eccentrically mounted motor—or vibrator underneath the screen, giving it a short, quick, circular, upward motion.

The screen frame is of cast steel as can be seen in the views. The screen cloth is held taut between two rigid arms or plates which are fastened to the ends of the vibrator casing below. The vibrator which is fastened to the screen frame by a steel strap (F) is allowed a slight rotary motion upon a ball and socket joint.

In the central larger cross section of the outer casting (A), the drive motor (B) is encased, the smaller sections at either side end encloses ring oil bearings (C) and ball cages (D). The casing being in two sections, is held together by bolts at (E) clamping the rotor stator between the inside faces of the casing.

A long shaft (H) is supported upon the ring oil bearings (C). The rotor of the motor (B) is keyed to the center and at either end are hard fibre cylindrical ball cages (D) having radially bored round holes, (I) slightly larger than the diameter of the balls (J).

Encircling the fibre ball cage and inside casing (A) are hard steel ball races (K). By filling these races with balls at the bottom on one end and top on the other end the eccentric motion is produced when the rotor is in motion.

When the current is turned on the small 1 h. p. motor in the vibrator rotates upon these bearings in such a manner as to give an eccentric motion. The motor-actuated vibration is applied continuously to the screening area from underneath by means of the rigid arms. Consequently the particles of the screening cloth describe minute circular paths. This motion of the screen up toward the material is claimed to greatly increase the screening efficiency. Since the motor rotates 3,600 times per minute the screen also vibrates that number of times.

The screen does not appear to be in motion, but when touched gives a sensation somewhat similar to an electric shock.

It is claimed that this screen is adaptable to use with either coarse or fine material when working wet or dry. In places where headroom and floor space are greatly reduced it is suitable because of size.

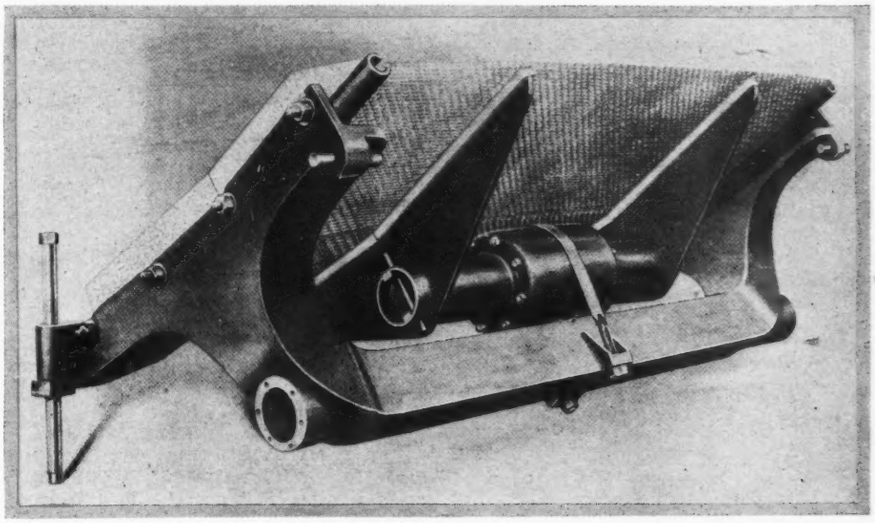
Owing to the fact that the motor is an integral part of the screen there is no necessity of line shafts.

To remove the screen cloth the four bolts holding the screen to the holder are removed and the cloth may be lifted out.

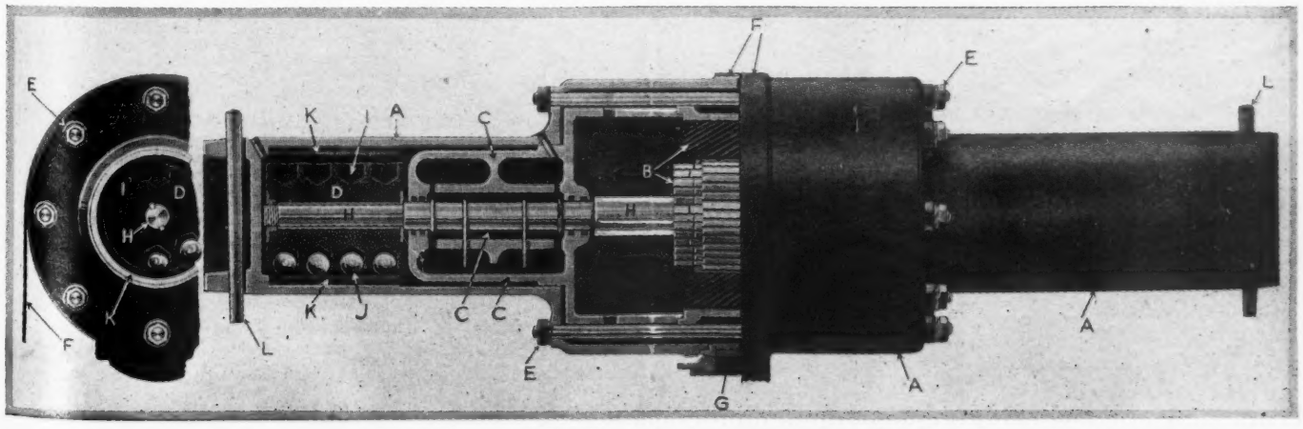
The angle of the screening plane is dependent upon the material used and may be altered by the use of the foot screws shown in the underneath view.

It is claimed that the upward impact of the vibratory blow is from 600 to 1000 lbs. and the rated capacity is 600 tons of dry material less than 10 mesh delivered screenings per 24 hours and 650 tons per 24 hours for wet work.

The Mitchell Electric Vibrating Screen is the invention of B. A. Mitchell, Chief Mechanical Engineer of the Utah Copper Co., Garfield, Utah, and was the result of two years' widely varied practical testing.



View of screen from underneath, showing rigid arms and vibrator in place



Vibrating mechanism of the Mitchell Electrical Vibrating Screen

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Bound Brook, N. J.	1.00	2.00	1.70	1.60	1.50	.....
Burlington, Vt.	1.00	.....	2.75	1.75	1.75	.....
Chaumont, N. Y.	.....	1.75	1.65	1.35	1.25	1.25
Coldwater, N. Y.			Flux, 1.50@2.10			
Limekiln, Md.	.75	1.85	1.65	1.50	1.25	1.10
North Leroy and Akron, N. Y.	1.00	1.00	1.00	1.00	1.00	1.00‖
Walford, Pa.	1.25	1.40	1.50	1.50	1.50	1.50
CENTRAL:						
Alton, Ill.	1.80	.....	1.40	1.35	.....	.....
Anna, Ill.			1.00@1.25 for prepared sizes			
Belvidere, Ill.			1.00 for any size produced			
Brillion and Sherwood, Wis.	.90@1.00	.....	1.00	1.00	.....	1.00
Buffalo, Ia.	.70	1.15	1.05	.95	.95	.....
Chicago, Ill.	.90@1.15	1.00@1.25	.90@1.15	.90@1.15	.80@1.00	.80@1.00
Davenport, Ia.	1.50*	1.50*	1.50*	1.50*	.....	.....
Dundas, Ont.	.65	1.20	1.20	1.20	1.00	1.00
Eden and Knowles, Wis.	1.00	1.00	1.00	1.00	1.00	.....
Elmhurst, Ill.	1.00@1.25	1.00@1.25	1.00@1.25	1.00@1.25	1.00@1.25	1.00@1.25
Greencastle, Ind.	1.25	1.10	1.00	.90	.90	.90
Hull, Canada	2.50	2.75	2.75	2.25	2.00	1.75
Illinois, Southern	2.00	1.25	1.25	1.25	1.10	.....
Kokomo, Ind.			.90@1.00 all sizes			
Lannon, Wis.			1.00 all sizes			
Mankato, Minn.	.....	.....	(1-in. 1.50)		(2-in. 1.25)	
McCook, Ill.	.90@1.10	1.50	.80@1.00	.70@ .85	.70@ .80	.70@ .80
Montrose, Ia.	1.25	1.15@1.25	1.15@1.25	1.10@1.25	1.10@1.15	.....
Oshkosh, Wis.			1.00 per ton, all sizes			
Ottawa, Ont.	2.50	2.75	.....	2.25	2.00	.....
River Rouge, Mich.	.95	1.15	1.15	1.15	1.15	1.15
Stolle, Ill.	.....	1.30	1.30	1.30	.....	.....
Stone City, Ia.	.50	.....	1.40	1.30	1.20	.....
Toronto, Canada	1.55	2.10	2.10	2.10	1.90	1.90
SOUTHERN:						
Brooksville, Fla.	1.00	.....	.....	2.60	.....	.....
Cartersville, Ga.	.....	1.95	.....	1.85	1.75	.....
Fort Springs, W. Va.	1.00	1.20	1.40	1.60	1.40	.....
Irvington, Ky.	.....	.....	1.00	1.00	1.00	1.00
Mascot, Tenn.	.....	1.00@1.25	.....	1.50	1.50	.....
Memphis Junction, Ky.			Average 1.10			
Winnfield, La.	.60	1.60	1.60	1.60	1.60	1.75
WESTERN:						
Atchison, Kans.	.50	1.80	1.80	1.80	1.70	1.70
			Rip-Rap, 1.30			
Blue Springs and Wymore, Neb.	.15	1.65	1.65	1.55	1.45	1.40
El Paso, Tex.			1.00 for all sizes			
Kansas City, Mo.	1.00	1.60	.....	.....	.....	.....

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Branford, Conn.	.80	1.50	1.50	1.20	1.10	.....
Birdsboro, Pa.	1.40	1.90	1.80	1.60	1.40	1.40
Castro Pt., Richmond, Cal.	.50*	.....	1.50*	1.50*	1.40*	.....
Duluth, Minn.	.50@.65	1.50	1.35	1.15	1.15	1.00
Farmington, Conn.	.....	1.05	1.05	1.05	.95	.....
Glen Mills, Pa.	1.00	1.35	1.70	1.55	1.35	1.35‖
Little Rock, Ark.	1.75	2.50	.....	2.00	1.50	1.35
Millington, N. J.	1.80	1.80	1.80	1.60	1.00	.....
New Britain, Conn.	.75	1.40	1.35	1.35	1.00	.....
Oakland, Calif.	.....	1.75*	1.75*	1.75*	1.75*	.....
Rock Hill, Pa.	1.00	1.35	1.70	1.55	1.35	1.35‖
Westfield, Mass.	.60	1.20	1.10	1.00	.90	.....
Winchester, Mass.	.75	.75	1.60	1.45	1.25	1.25‖

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Fair Oaks, Calif.—Cr. Bldrs.	.85	1.05	.95	.85	.85	.....
Hendlers, Pa.—Quartzite	.80	1.00	1.25	1.00	1.00	1.00‖
Little Falls, N. Y.—Syenite	.80	1.20	1.40	1.20	1.20	1.20‖
Middlebrook, Mo.—Granite	3.50	.....	1.75	1.75	.....	1.00‡
Portland, Maine—Granite	1.50	.....	.....	1.35	1.25	.....
Roseburg, Ore.	.....	1.50	1.25	1.05	1.00	1.00
Redington, Pa.—Dolomite	1.00	1.10	1.10	1.10	1.10	1.10‖
Stockbridge, Ga.—Granite	.50	2.00	1.90	1.75	1.75	.....
White Haven, Pa.—Sandstone	.85	1.20	1.40	1.20	1.20	1.20‖
Granite	1.25	.....	1.50	1.50	1.50	.....

*Cubic yard. †Agrl. lime. ‖R. R. ballast. §Flux. ‡Rip-rap. a 3-inch and less.

Agricultural Limestone Wholesale at Plant, per Ton

EASTERN:

Coldwater, near Rochester, N. Y.—Analysis: $CaCo_3$, 56.77%; $MgCo_3$, 41.74%—80% thru 100 mesh; ppr., 4.50; bulk 3.00

Chaumont, N. Y.—Analysis: $CaCo_3$, 92 to 98%; $MgCo_3$, 1.51%—(Thru 100 mesh); ppr., 4.00; bulk 2.50
Paper bags 4.00

Cobleskill, N. Y.—Ppr., 5.00; bulk 3.00

Grove City, Pa.—Analysis: $CaCo_3$, 94.75%; $MgCo_3$, 1.20%—(70% thru 100 mesh); 80 lb. ppr., 4.60; bulk 3.25

Grove, Md.—90% thru 4 mesh; bulk 3.00

Hillsville, Pa.—Analysis, $CaCo_3$, 85%; $MgCo_3$, 1½%—(70% thru 100 mesh) in 80 lb. ppr. bags, 4.25; bulk 2.75

Jamesville, N. Y.—68% thru 100 mesh; 95% thru 50; 100% thru 20. Sacks, 3.75; bulk 2.25

Lime Kiln, Md.—50% thru 50 mesh; bulk 4.00

Pownal, Vt.—(50% thru 100) Analysis, $CaCo_3$, 90%; $MgCo_3$, 5%; ppr., $4.50; bulk 2.75

Walford, Pa.—(70% thru 100 mesh; 85% thru 50; 50% thru 50; 100% thru 4); sacked, 4.25; bulk 2.75

West Stockbridge, Mass. — Analysis: Combined carbonate, 95%—33% thru 200 mesh; 66% thru 100; 100% thru 40. Bulk 2.85

Williamsport, Pa. — Analysis, $CaCo_3$, 88-90%; $MgCo_3$, 3-4%—(50% thru 50 mesh) ..... 3.00@4.50

CENTRAL:

Alton, Ill.—Analysis: $CaCo_3$, 96%; $MgCo_3$, 0.75%—90% thru 100 mesh.. 3.00
50% thru 50 mesh 2.00

Anna, Ill.—Ground; bulk 1.25

Bedford, Ind.—(90% thru 10 mesh) Analysis, $CaCe_3$, 98.5%; $MgCo_3$, 0.5% 1.50

Canton, O.—100% thru 10 mesh; 49% thru 100; 59% thru 50 ..... 3.00
80 lb. bags 4.80

Chicago, Ill.—Analysis, $CaCo_3$, 53.63%; $MgCo_3$, 37.51%—90% thru 50 mesh 1.00

Columbia, Ill., near East St. Louis —(⅛" down) ..... 1.25@1.80

Ellettsville, Ind.—Analysis, Carbonate, 98% 2.00

Elmhurst, Ill. — (Analysis, $CaCo_3$, 35.73%; $MgCo_3$, 20.69%) 50% thru 50 mesh 1.25

Greencastle, Ind.—(Analysis, $CaCo_3$, 98%) 50% thru 50 mesh 1.75

Howenstein, O.—100% thru 10 mesh; 59% thru 50; 39% thru 100 ..... 2.75@3.00

Lannon, Wis.—(90% thru 50 mesh) Analysis, 54%, $CaCo_3$; 44%, $MgCo_3$ 2.00

Marble Cliff, O.—(50% thru 100 mesh) Analysis, $CaCo_3$, 86%; $MgCo_3$, 8%.. 2.50

Marblehead, O. — (Analysis: $CaCo_3$, 95.33%) 100% thru 100 mesh, sacks, 4.50; bulk 2.50

McCook, Ill.—Analysis, $CaCo_3$, 54.10%; $MgCo_3$, 45.04% — 100% thru ¼" sieve; 78.12% thru No. 10; 53.29% thru No. 20; 38.14% thru No. 30; 26.04% thru No. 50; 16.27% thru 100 ..... .90@1.00

Milltown, Ind.—Analysis, $CaCo_3$, 94%; $MgCo_3$, 3% 1.50

Monon, Ind. 1.25

Montrose, Ia.—(90% thru 100 mesh).. 1.25

Mountville, Va.—Analysis, $CaCo_3$, 76.6%; $MgCo_3$, 22.8%—30% thru 100 mesh; 100% thru 20 mesh 4.00

Muskegon, Mich.—(90% thru 50 mesh) Analysis, $CaCo_3$, 53.35%; $MgCo_3$, 43.27% 2.50

Piqua, O.—Analysis: $CaCo_3$, 82.8%; $MgCo_3$, 8.2%; neutralizing power in terms of calcium carbonate, 95.3%—70% thru 100 mesh, bulk ..... 2.50@4.00

(Continued on next page.)

Agricultural Limestone Wholesale at Plant, per Ton

(Continued from preceding page.)

Rockford, Ill. — Analysis, $CaCo_3$, 53.75%; $MgCo_3$, 44.35%	1.25
St. Paul, Ind.—Analysis, $CaCo_3$, 85%; $MgCo_3$, 12%	1.50
Stolle, Ill. (near East St. Louis on I. C. R. R.)—(Thru ⅛" mesh) Analysis, $CaCo_3$, 89.61 to 89.91%; $MgCo_3$, 3.82%	2.00
Stone City, Ia.—Analysis, $CaCo_3$, 98% (90% thru 50 mesh)	.50
Toledo, O.—Analysis, $CaCo_3$, 52.72%; $MgCo_3$, 43%—(20% thru 100 mesh; 30% thru 50; 80% thru 100; 100% thru 5/32 screen)	1.80
Whitehill, Ill. — Analysis, $CaCo_3$, 96.12%; $MgCo_3$, 2.50%—	
50% thru 50 mesh, bulk	2.00
90% thru 100 mesh	5.00
SOUTHERN:	
Cartersville, Ga.—Analysis: 96 to 98% combined carbonates—All thru 10 mesh with all dust in	2.50
Dittlinger, Tex. — Analysis, $CaCo_3$, 99.09%; $MgCo_3$, .04%.	
90% thru 100 mesh	2.00
90% thru 4 mesh	1.00
Grovania, Ga.—Analysis, $CaCo_3$, 95%; $MgCo_3$, none—50% thru 100 mesh	2.50
Hopkinsville, Ky.—Analysis, 94.6 to 98.1% $CaCo_3$—Bulk	2.00
Irvington, Ky.—(90% thru 50 mesh)	2.00
Memphis Jct., Ky.—(Analysis, $CaCo_3$, 95.31%; $MgCo_3$, 1.12%) average price	2.00
Mascot, Tenn.—Analysis, $CaCo_3$, 52%; $MgCo_3$, 38%.	
(80% thru 100 mesh)	2.50
(All thru 10 mesh)	2.00
80% thru 200 mesh	3.50
Paper bags $1.50 extra per ton; burlap, 2.00 extra per ton.	
Maxwell, Va.	2.50
Ocala, Fla.—Analysis, $CaCo_3$, 98%—(75% thru 200 mesh)	4.50
Tyrone, Ky.—Analysis, $CaCo_3$, 93%; $MgCo_3$, 6%—90% thru 4 mesh	2.25
Winnfield, La.—(90% thru 50 mesh)	3.00
WESTERN:	
Fresno, Calif.—(Analysis, $CaCo_3$, 94%; $MgCo_3$, .02%) 50% thru 200 mesh; 90% thru 100; 100% thru 40. Prices for delivery: Sacks, 6.50; bulk Sacks, 10c each.	6.00
Kansas City, Mo., Corrigan Sid'g—50% thru 50 mesh; bulk	1.35

Miscellaneous Sands per Ton at Plant

Silica sand is quoted washed, dried and screened, unless otherwise stated.

GLASS SAND:	
Berkeley Springs, W. Va.	2.00@2.10
Special hand selected rock	2.50
Cedarville and South Vineland, N. J.—	
Glass, damp	2.00
Glass, dry	2.50
Gray Summit, Mo.	2.00@2.50
Guion, Ark.—Contracts	1.50
Carlots	2.50
Hancock, Md.—Engine and glass	2.50@3.00
Klondike and Pacific, Mo.:	
Contracts	2.00
Car lots	2.50
Mapleton, Pa.	2.50
Glass, damp	2.00
Massillon, Ohio	3.00
Michigan City, Ind.	.30@ .40
Millington, Ill.	1.75
Mineral Ridge, O.	2.75
Montoursville, Pa.—Green, washed	2.75
Ottawa, Ill—Without contracts	2.00
Large contracts	1.75
Robinson, Md., washed, screened, not dried	2.00
Sands, Elk Co., Pa.—Selected, green	2.50
Thayer, W. Va.—Washed	2.25
FOUNDRY SAND:	
Albany, N. Y.—Core	1.25@2.00
Molding fine, furnace lining	2.00
Molding coarse	1.80
Brass molding	2.00
Sand blast	1.50@3.50
Allentown, Pa.—Core	1.25@1.50
Arenzville, Ill.—Molding fine	1.50

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 inch down	Sand, ¼ inch and less	Gravel, ½ inch and less	Gravel, 1 inch and less	Gravel, 1½ inch and less	Gravel, 2 inch and less
EASTERN:						
Ambridge, South Heights, Pa.		1.00		1.00	.80	.80
Attica, N. Y.	.60	.60	.60	.75	.75	.75
Boston, Mass.	1.65	1.10	2.25	1.75	1.75	1.60
Farmingdale, N. J.		.43	1.25	1.15	1.05	
Morristown, N. J.	.60	.60	1.20	1.00	1.00	
Washington, D. C.—Wharves	.75	.75	2.00	1.40	1.20	1.20
West Peabody, Mass.	.35@ .45	.35@ .45	2.00	1.20	1.20	1.20
CENTRAL:						
Alton, Ill.	.75	.75		1.35	1.20	1.20
Attica, Covington, Silverwood, Ind., Palestine, Ill.	.75	.75	.75	.75	.75	.75
Barton, Wis.	.75	.70	1.00	.70	.70	.70
Chicago		1.25@1.50	1.10@1.25	1.10@1.25	1.10@1.25	1.10@1.25
Columbus, O.		.65@1.00	1.00	.70@1.00	.70@1.00	.65@1.00
Des Moines, Ia.	.60@1.00	.60	1.50	1.50	1.40	1.40
Earlestead, near Flint, Mich.		.65@ .75			.85@ .95	.85@ .95
Escanaba, Mich.		.90	1.60	1.20	1.00	.90
Fort Dodge, Ia.	1.20	1.10	1.85	1.85	1.85	1.85
Grand Rapids, Mich.	.75@ .85	.60@ .75	1.25@1.35	1.15	1.00	1.00
Grass, Mich.		.90	1.60	1.20	1.00	.90
Hersey, Mich.		.50		1.00	1.00	
Illinois, Northern	.50@ .60	.60@ .70	.75	.60@ .75	.60@ .75	.60@ .70
Indianapolis, Ind.	.60	.60		1.50	.75	.75
Janesville, Wis.		.50			.60@ .70	
Mason City, Ia.	.70	.60	1.55	1.50	1.40	1.35
Milwaukee, Wis.			1.20 for all sizes			
Minneapolis, Minn.	.50	.50	1.75	1.50	1.35	1.35
Moline, Ill.	.60	.60	1.10	1.00	1.00	1.00
Montezuma, Covington, Ind.	.75	.75	.85	.75	.75	.75
Oxford, Mich.					.85	
Rockford, Ill.	.60		.75	.75	.75	.75
Saginaw, Mich. (River Sand)	1.05	1.05	1.85	1.60	1.60	1.45
St. Louis, Mo.	(Mississippi sand, 1.90; Meramec river sand, 1.95)					
St. Louis, Mo., F. O. B. cars	1.35	1.20	1.50	1.30		1.25
Summit Grove, Ind.	.75					
Terre Haute, Ind.	.75	.75	.85	.75	.75	.75
Winona, Minn.		.70	1.60	1.10	1.10	1.10
SOUTHERN:						
Knoxville, Tenn.	.85	.85	1.50	1.50	1.50	1.20
Lake Weir, Fla.		.50				
Macon, Ga.		.75				
New Martinsville, W. Va.	1.30	1.00@1.10		1.20		.70@ .80
Roseland, La., and Condron, Miss.		.40	1.00	1.00	1.00	1.00
Thomas, La.	.60					1.75
Valde Rouge, La.		.80				1.25@1.50
Waco, Texas		.70			1.10	1.10
WESTERN:						
Kansas City, Mo.	.60	.60	(Kaw river sand .60 per ton carlots)			
Lincoln, Neb. (on cars)	1.00	1.00	2.10	2.10		1.90
Niles, Calif.		.50@ .75	.50@ .75	.50@ .75	.50@ .75	.50@ .75
Pine Bluff, Ark.	1.00	.90			1.30	
Pueblo, Col.	.80*	.60*		1.50*		
Roseburg, Ore.	1.50	1.00	1.25	1.00	1.00	1.00
San Francisco, Cal.	1.25	1.25	1.50	1.15	1.15	1.15
Saratoga, San Jose, Calif.		.60@ .75	.60@ .70	.60@ .70	.60@ .70	.60@ .70
Seattle, Wash.	1.25*	1.25*	2.00*	1.25*	1.25*	1.25*
Vancouver, Wash.		1.10*		1.30*		1.10*
Yorkville, Ore.	.60	.60@ .75	.70	.60@ .75	.60	.50@ .60

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 inch down	Sand, ¼ inch and less	Gravel, ½ inch and less	Gravel, 1 inch and less	Gravel, 1½ inch and less	Gravel, 2 inch and less
EASTERN:						
Boonville, N. Y.	.60	.50@ .65				.65
Burnside, Conn.	.80*					
Lowell Junction, Mass.	.75*	.65*@.75*	.60*			
Yardville, N. J.		.50@ .75				
York, Pa.		1.00@1.10	(crushed rock sand)			
CENTRAL:						
Attica, Covington, Silverwood, Ind., Palestine, Ill.	.60	.60	.60	.60	.60	.60
Des Moines, Ia.	Washed concrete mix., 25% gravel, .80; 50% gravel, 1.00					
Earlestead, near Flint, Mich.	.55@ .65					
Escanaba, Mich.			1.00 cu. yd., all sizes			
Grand Rapids, Mich.	.60			.75		.60
Grass, Mich.			1.00* (all sizes)			
Hersey, Mich.	.40			.50	.50	.50
Illinois, Northern						.50@ .60
Indianapolis, Ind.	Washed concrete, mix, .65					
Janesville, Wis.					.55	
Montezuma, Terre Haute, Ind.					.60	.60
Oxford, Mich.					1.00	
Rockford, Ill.	Sand and Gravel mixed, .55@.65					
Saginaw, Mich. (Incldg. frt.)	1.05	1.05	1.20	1.20	1.20	1.20
Summit Grove, Ind.	.50					
Wabash Valley District, Ind.	.60 for all sizes					
Winona, Minn.	Pit run gravel under 2-in., .70					
SOUTHERN:						
Albany, Ga.	.70@1.00					
Dudley, Ky. (Crushed Sand)	.95	.90		1.00		
Lindsay, Texas		1.50			.50	
Pine Bluff, Ark. (Road Gravel)					.45	
Thomas, La.						.40@ .70
Valde Rouge, La.						.60@ .75
Waco, Texas						.67
WESTERN:						
Pueblo, Col.		.60*	River Run, .60 unscreened			
Saratoga, San Jose, Calif.		.60@ .75	.60@ .70	.60@ .70	.60@ .70	.60@ .70
Yorkville, Ore.		.40			.40	

* Cubic yard. B Bank. L Lake. || Ballast.

Crushed Slag Wholesale at Plant Per Ton

City or shipping point	Roofing	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:							
Bethlehem and Emaus, Pa.	2.50	.85	1.50	.85	.85	.85	.85
Buffalo, N. Y.	1.75@2.00	.85	.85	.85	.85	.85	.85
E. Canaan, Conn.	4.00	1.00	1.50	1.15	1.00	1.00	1.00
Erie, Pa.	1.75	.85@1.00	1.00@1.50		1.00	1.00	1.00
Emporium, Pa.		1.00	1.00		1.00	1.00	1.00
Ensley, Ala.	2.05	.90		.90@1.20	1.00	.90	.85
Hokendaugua and Topton, Pa.	2.50	.85	1.50	.85	.85	.85	.85
Lebanon (Donaghmore), Pa.	2.50	.85	1.50	.85	.85	.85	.85
Philadelphia Dist.	2.50	.75	1.50	.85	.85	.85	.85
Pittsburgh, Pa. (West)	2.05	1.10	1.50	1.10	1.10	1.10	1.10
Sharpsville, Pa.	1.75	1.00	1.25	1.00	1.00	1.00	1.00
CENTRAL:							
Chicago, Ill.	All sizes, $1.50, F. O. B. Chicago						
Detroit, Mich.	All sizes, 1.65, F. O. B. Detroit						
Ironton and Jackson, O.	2.00	1.25	1.50	1.25	1.25	1.25	1.25
Toledo, O.	All sizes, 2.00, F. O. B. Toledo						
Youngstown, Sharpsville, Hubbard, Leetonia, O.	2.00	1.10	1.50	1.10	1.10	1.10	1.10

Agricultural Lime and Hydrate at Plant Per Ton

	—Agricultural Lime— Bulk	Bags	Per Cent CaO	Per Cent MgO	Agricultural Hydrate Bags
EASTERN:					
Adams, Mass.		7.50@8.00	65		
Berkeley, R. I.		16.00	45	15	
Bellefonte, Pa.	7.25		95.5	.72 to .89	
Bridgeport, Pa.	7.50		55	44	10.50
Cavendish, Vt.		2.50 bbl. in car lots			
Cavetown, Md.	8.50				
Cedar Hollow, Devault, Rambo and Swedeland, Pa.	8.00	10.75 grd.	58	38	10.75
Chippewa, Lycoming Co., Pa.	5.00@5.50		78.67	1.33	
East Sparta, O.					9.00
Espy, Pa.	4.50		82	1.25	
Farnams, Mass.	5.00	7.50			
Frederick, Md.	7.75		88	5 to 8	10.50
Grove City, Pa.	7.00 lmp.	9.00 grd.	75.48	0.80	10.00
Grove, Md.	8.00				10.75
Highgate Springs, Vt.		8.00	85	2	
Hollidaysburg, Pa.	6.50		94.25	.30	
Hyndman, Pa.	5.00	8.50	80.23	2.87	
Lime Bluff, Pa.	5.00@6.25		78.67	1.33	
Lime Ridge, Pa.	5.00@6.25		80.56 to 62.56	3.87 to 1.75	
Mt. Union, Pa.	4.13		96.6		
Newburgh, N. Y.			57	38	8.00
New Castle, Pa.	3.50	4.50	47.6 to 50.4	0.62 to 1.12	
Ottawa, Ont.	12.00		95	1.5	
Paxtang, Pa.	5.00		60	12	
Rosedale, N. Y.	8.00		96	5	(Bulk, 6.00)
Steuben, Pa., Dover Plains, N. Y., York, Pa.		7.00@9.50	70		10.75 to 12.00
Union Bridge, Md.	8.50		73	1	10.75
West Rutland, Vt.	5.00	7.50	68	3	10.00
Williamsport, Pa.	5.50	10.00	65 to 80	2 to 4	10.00
Williams Station, Pa.	7.50		60.6	39.1	9.75@10.50
York, Pa.	8.00		90 to 95	2 to 7	10.75
Zylontte Station, Adams, Mass.		8.00			
CENTRAL:					
Delaware, O.			50	9	9.75
Forest, O.	7.50				
Manistique, Mich.		10.00	54 & 95	40 & 1.75	10.00
Mitchell, Ind.	9.00				11.00
Springfield, O.			33.62	17.73	9.00
Woodville, Ohio		9.25	46 to 48	30 to 34	9.25
SOUTHERN:					
Burns, Tenn.	8.00		96	0.54	11.50
Chippewa, Fla.	5.00		80.0	15.0	
Erin, Tenn.	8.00		97		
Lineton, Va.	8.50		97	1.74	
Louis Brook, Va.	8.00	10.25	90	1	
Lushing, Va.	9.00	11.25	60	15	12.75
Maxwell, Va.	4.50		82	1.75	
Newala, Ala.	8.50@9.00		99.33		
Ocala, Fla.	4.00	6.00 pulv.	98½ (dry basis)		
Staunton, Va.	6.50	9.00	93	5.5	
WESTERN:					12.00
Bellins, Wash.					
Colton, Calif.	4.50		95 to 97	1.5 to 3.0	
Dittlinger, Texas		9.00@11.00	98.62	0.29	12.50@15.00
Kirtland, N. M.	10.00				
Knowles, Wis.	8.00	9.50	55	45	9.50
Lime, Ore.	15.00		91.48	0.58	
Oscas Island, Wash.		5.50			16.50
San Francisco, Calif.					15.00
Tehachapi, Cal.	6.00	8.00	96	2	

Miscellaneous Sands per Ton at Plant

(Continued from preceding page)

Bowmanstown, Pa.—Core	1.25
Molding fine or coarse	1.50
Traction	1.25
Cedarville and So. Vineland, N. J.—	
Core, damp	2.00
Core, dry	2.50
Cleveland, O.—Core	1.00@1.50
Molding fine, molding coarse	1.75@2.25
Brass molding	1.50@2.50
Delaware, N. J.—Molding	1.50@2.00
Dundee, Ohio—Molding, steel	1.75
Eau Claire, Wis.—Core	2.25
Roofing sand	3.00
Brass molding and sand blast	2.25
Fleetwood, Pa.—Furnace lining	2.25
Franklin, Pa.—Core, traction and brass molding	2.00
Molding, fine	2.00
Molding, coarse	1.50@1.75
Gray Summit, Klondike and Pacific, Mo.—Molding fine	1.50@2.00
Greenville, Ill.—Molding coarse red	1.60
Guion, Ark.—Filter	2.50
Hancock, Md.—Core and brass mldg.	1.65
Hellam, Pa.—Core	2.00
Joplin, Mo.—Stone sawing, flint	1.25
Kansas City, Mo.—Missouri River core	.85
Leesburg, Pa.—Core, furnace lining, molding fine and coarse	2.00
Mapleton, Pa.—Molding, fine and core, damp	2.00@2.50
Molding, fine, dry	3.00
Massillon, O.—Steel molding coarse	2.50
Molding fine	3.00
Molding coarse	2.50
Traction	2.50
Furnace lining	3.00
Core	2.50
Michigan City, Ind.—Core, bank	.30@.50
Millington, Ill.—Furnace lining, roofing, stone sawing	1.75
Core	1.50
Mineral Ridge, O.—Core, molding, sand blast, roofing, brass molding, etc., washed, screened (damp)	2.10
Montoursville, Pa.—Core, molding fine, traction, brass molding	1.25@1.75
Ohio—Various points:	
Iron molding, fine	1.50@2.25
Iron molding, coarse	1.75
Brass molding, minimum	2.00
Ottawa, Ill.—Sand blast	2.75
Core, furnace, steel molding	2.00
Roofing sand	2.00@3.50
Stone sawing	1.75
Providence, R. I.—Molding fine	2.00
Molding coarse	1.90
Brass molding	2.25
Sand blast	3.00@4.00
Sugar Grove, Ohio—Core (dried and screened)	2.00
Traction	2.00
Thayers, Pa.—Core and traction	1.75
Furnace lining, molding	1.25
Utica, Pa.—Core	2.00
Molding coarse, steel	2.00
Traction	2.00
Brass molding	2.00
Warwick, O.—Core	2.25
Furnace lining, green	2.00
Molding fine	2.25
Molding, dried and screened	2.25
Green	1.75@2.00
Traction and brass molding	2.25
Wedron, Ill.—Core, (crude silica)	.75
Furnace lining, molding fine	.75
West Albany, N. Y.—Molding fine	1.75@2.25
Molding coarse	1.50
Brass molding	1.75
Zanesville, O.—Molding fine	1.50@2.00
Traction	.75
Molding coarse	1.25@1.50
Brass molding	1.50@2.00

Ground Gypsum Rock, per Ton, at Plant

Castalia, O.—Raw, to cement mills	3.50
Crushed, not ground	3.00
Land plaster	6.00
Fort Dodge, Ia., bulk	4.00
Garhutt, N. Y.—Land plaster, bags	7.00
Grand Rapids, Mich.—Crushed gypsum	6.00
Ground gypsum rock	7.00
Gypsumville, Man., Can.	3.00
Oakfield, N. Y.	7.00
Sandusky, O.	6.00

Jute sacks, $3.00 extra; paper, $1.00 extra.

Ground Rock Phosphate at Plant, per Ton

Centerville, Tenn.—B. P. L., 60% to 70%; ton, 2240 lbs. Ground rock phosphate (90% thru 100 mesh)	8.00
Lump rock, 72% to 75%, B. P. L.	6.00@8.50
Centreville, Tenn.—B. P. L., 60%	7.00
B. P. L., 70%	7.75@8.00
B. P. L., 78%	8.00
Gordonsburg, Tenn.—B. P. L., 72%; ton, 2240 lbs. Ground 90% thru 100 mesh	8.50@9.00
Lump rock	6.00@7.50
Mt. Pleasant, Tenn—(B. P. L., 70%)	
12%	6.00
13%	7.00
14%	8.00
Mt. Pleasant, Tenn.—B. P. L., 60% to 70%	8.00@9.50
Nichols, Fla.—Pebble, B. P. L., 70%	10.00
Wales, Tenn.—B. P. L., 70%	7.50@8.50
Walls, Tenn.—B. P. L., 70.2%—	
To County Agri. Assns.	7.50
To others	7.75

Florida Soft Phosphate

Jacksonville (Fla.) District (Add 2.50 for sacks)	10.00@12.00
Phoslime, Fla. (in burlap bags, 100-200 lbs.)	14.00
Benotis, Fla.	9.00@11.00

General News From the Rock Products Markets

Lime Exhibit at International Live Stock Show

THE UNITED STATES DEPARTMENT OF AGRICULTURE is preparing an extensive educational exhibit for the International Live Stock Show, to be held in Chicago November 29 to December 6. The National Lime Association has been invited to co-operate, by supplying materials, charts, and data for an exhibit of all the different kinds of liming materials suitable for use on the soil of both low and high grade, in such form as to show their equivalent content of available oxides of lime and the relative cost of these oxides delivered on the farmer's land.

In this exhibit it is intended to include a wide range of materials so that the contrasts in their composition and cost may be most clear.

Illinois Sand and Gravel Prospects for Next Year

OFFICIALS of the Illinois Highway Department have expressed considerable anxiety as to volume of supply for next year's road program. It is apparent now that less than 200 miles of the work let this year will be completed and that more than 400 miles will be carried over.

To carry out the Illinois program it will be necessary to build approximately 1,500 miles of road next year—a stupendous undertaking. Arrangements are now being made for a conference of material producers with the Highway Department. The Chicago Association has already appointed a committee for this conference and simliar action will be taken by the Executive Committee of the Illinois Association at its October meeting.

Invitation extended some weeks ago to highway officials to inspect plants operated by members of the Chicago Association has been accepted. Committee appointed last week to arrange itinerary and other details of the trip will report at regular meeting next Wednesday. Each member should be vitally interested in this and should arrange his affairs so as to make the trip. It will require at least three days.—Chicago Sand and Gravel Producers' Association Letter.

May Double Potash Prices

WEIMAR, Germany—The potash syndicate has asked the government to grant permission to raise the price of potash 100 per cent owing to the increased cost of production. The syndicate says it has a deficit of 46,000,000 marks ($11,500,000) for the first three months of this year.

Wisconsin Has Completed 90 Per Cent of Road Work

ACCORDING to a comparison of figures, the amount of highway work completed this year in Wisconsin exceeds that in Illinois.

This year contracts were awarded for 1,393,399 sq. yds., slightly more than 90 per cent of which will be completed. This does not take into consideration any yardage that may have been awarded in 1918 and carried over. The State Highway Department has adopted a policy which it will continue to pursue, of awarding each year no more contracts than their department can adequately handle and which, in their opinion, can be completed during that year. It is believed that this is the ideal policy, rather than to award a large mileage of roads, which might possibly take two or more years to complete after the award of the contracts.

Labor and materials are so uncertain that contractors bidding on work under these conditions are taking considerably more of a gamble and for this reason must of necessity bid higher than the contractors of Wisconsin, who, as stated before, will finish 90 per cent of the work the same year awarded.

The Wisconsin Mineral Aggregate Association, in its News Letter, is conducting an investigation among its members to ascertain just how much the labor wage scale has increased this year.

Minnesota Will Build Roads

C. M. BABCOCK, State Highway Commissioner of Minnesota, states that $30,000,000 will be available for road building in that State during the next year.—Macadam Service.

Prospects for Constructive Railroad Legislation

ALTHOUGH the prospects for constructive railroad legislation seem brighter now than at any time since the question was taken up in Congress, it is highly probable that definite action will not be taken at this session.

The real problem is to provide adequate service to the public, an adequate wage to employes and adequate revenue to the carriers. The great volume of testimony and variety of plans submitted by individuals and groups interested have produced confusion, and about all that can be expected from the present Congress is a resolution instructing the President not to carry out his expressed intention of returning the railroads to their owners on January 1st.—Chicago Sand & Gravel Producers' Association Letter.

New Type of Concrete Road Construction

AT TERRE HAUTE, IND., a new kind of concrete road construction, known as "vibrolithic concrete," is being laid by the Carpenter Construction Co., of that city. It is built by laying a 6-in. gravel concrete course in the usual manner, striking off to the crown of the road, then covered to about 1½ inches deep with loose, clean granite or washed gravel, size ¾ to 1¼ inches, and compacted by a special vibrating machine operating on a slotted platform.

This process drives the top stone into the mass, forcing upward excess mortar, water and air bubbles, thus closing all voids and completing the contact between the particles of the aggregate from the top surface to the bottom. A very dense concrete is produced, with only sufficient moisture left to set the concrete properly.

Immediately after this treatment, requiring only a few minutes, one can walk on the road without dislodging a stone or in any way injuring the surface. Vibrolithic construction has succeeded in the South for the past 7 years. This is its first appearance in the northern states.—The Indiana Sand and Gravel Producers Association News Letter.

Time to Speed Up Production

THE WISCONSIN MINERAL AGGREGATE ASSOCIATION has issued the following advice to its members:

"Weather records from previous years indicate that there remains but some 30 more operating days for the majority of producers in the State of Wisconsin.

"In view of this fact, it would be well for managers to make every possible effort to speed up shipment so that the business on hand may be cleaned up.

"Where shortage of cars is holding up operation, the association headquarters should be immediately notified and all steps possible will be taken to aid.

"Railroad officials have shown inclinations to assist in this matter and where members have reported consistent daily shortage, it has been possible, through the assistance of the officials of the line on which they are located, to increase the supply."

To Have $20,000,000 Available

WISCONSIN will have more than $20,000,000 available for highway building in the next three years. The legislature, on June 11, appropriated $1,700,000 annually to match Federal aid allotments to the State for the three-year period ending in 1921.

Incorporations

Montreal Quarry, Montreal, has registered articles of incorporation.

Ontario Feldspar Limited, Toronto, has been incorporated with a capital of $100,000.

The Harding and Vance Co., Carthage, Mo., has been incorporated to quarry and crush stone.

J. H. Giroux, general contractor, is erecting a $10,000 lime furnace at St. Louis de France, Quebec.

The Batesville Gravel and Material Co., Batesville, Ark., has increased their capital from $5,000 to $75,000.

Rochester Sand and Gravel Co., Ltd., Edmonton, Alberta, has been incorporated with a capital of $20,000.

The Boston Oil Shale Co., Augusta, Maine, has been incorporated with a capital of $1,000,000 to quarry shale for mineral oil, petroleum, etc., and prepare same for the market.

The W. McMillan & Son Co., Bedford, Ind., has been incorporated with a capital of $1,000,000 and will quarry, buy and sell stone. The directors are W. M. McMillan, Ralph Reed and B. P. Crowe.

The Eastern Trap Rock Co., New Haven, Conn., has been incorporated with $150,000 capital to quarry and sell trap rock. The incorporators are A. G. Pasquier and S. C. Denby, of New Haven, and C. C. Carroll, of Wallingford, Conn.

The Pennsylvania Lime Products Co., Philadelphia, Pa., has made application for a charter. It will manufacture, sell and market all kinds of lime, mortar, plaster, cement and similar products, and will quarry limestone and other materials to be used in said manufacturing.

The Crystal Lime Co., Limited, Lewiston, Idaho, has been incorporated for $100,000. The plant will be located at Oro Frisco, Idaho, 42 miles southeast of Lewiston on Clearwater River and on a branch line of the N. P. Railroad. The company will produce hydrated lime, lump lime, agricultural lime, terrazza.

Manufacturers

The Arnold and Weigel Co., contractors and engineers, Woodville, Ohio, is circulating a small condensed booklet which is interesting not only because of its information regarding the Arnold lining for lime kilns, but because of the considerable information about lime burning in general.

The Traylor Engineering and Manufacturing Co., Allentown, Pa., according to reports from its Chicago office, has been making an unusually large number of sales of big crushers. Seven 10x72-in. jaw crushers are being installed for a Texas company to replace a battery of gyratory crushers.

The Du Pont Chemical Co., Wilmington, Del., have recently closed down the plants operated during the war and will dispose of the machines. They are circulating a booklet which enumerates the things for sale, which range from blacksmith anvils to stone crushers, and includes apparatus of all descriptions.

The Service Recorder Co., Cleveland, Ohio, has just completed and is presenting to the user of motor trucks The Servis Time Record Book. The object of this booklet is to enable the truck owner to preserve and compare in graphical form the daily performance of his trucks. This is especially suitable for use in connection with the Servis recorder manufactured by the same company.

The Howe Chain Co., Muskegon, Mich., is circulating a 22-page catalog (No. 100) presenting Howe chains and buckets. A wide variety of malleable iron chains suitable for use in elevating, conveying, transmission of power, and industrial work are well illustrated and described. This booklet also features a special heavy duty chain to be used for elevators handling abrasive and gritty materials, such as cement, ore and sand. A large number of copies of this catalog is on hand and the company will send them to any one interested.

Lime

George M. Bushey & Sons, Cavetown, Md., are building a hydrated lime plant. This concern is also building an agricultural limestone plant of large capacity and a new crushing plant for fluxing stone. Richard K. Meade, consulting engineer, Baltimore, Md., is in charge of design and construction.

The Ladd Lime and Stone Co., Cartersville, Ga., whose crushing plant and agricultural limestone plant were described in ROCK PRODUCTS of June 21, 1919, is building a plant to produce 50 tons of hydrated lime per day. It is expected the lime plant will be ready for operation March 1 next. L. J. Backus is general manager of the company. Richard K. Meade, consulting engineer, Baltimore, Md., is engineer in charge of design and construction.

Quarries

The General Pulverized Limestone Co., Columbia, N. J., has just placed in operation one of the most modern and most completely equipped plants in the East for the pulverizing of agricultural and chemical limestone.

The Eastern Stone Producers Association was not successful in getting the schedule of rates won from the Pennsylvania Railroad in the famous Birdsboro Stone Co. case put into effect on the other railways of the State of Pennsylvania.

Altoona, Pa.—As a result of the steel strike, according to local reports, the limestone quarries at Clover Creek, Wertz, Franklin Forge, Carlin and Blairfour, closed down. They furnish limestone to steel mills. Approximately 800 men employed at the quarries are idle.

The Kelley Island Lime and Transport Co. has been forced to shut down part of its Marblehead, Ohio, plant. A large part of this company's business is in furnishing fluxing stone for the steel mills. Due to the steel strike the need of fluxing stone has fallen off so that the temporary close down has resulted.

The Canada Crushed Stone Corporation, Dundas, Ont., is fast completing its new buildings. The large steel towers are completed at the lower plant. When complete, the plant will probably be the largest of its kind in Canada. Some of the machinery was made on a special order and is said to be among the largest in America. At the upper plant a crusher of 3,000 tons capacity has been installed, though it will not be operated at that high rate.

H. E. Stratton, business man of the Toronto district, and son have completed plans for the opening up of a stone quarry at Port Homer. The quarry there is said to contain one of the highest grades of pulp stone in the country. The Stratton company, it is announced, will quarry the stone and manufacture it into grindstone. The quarry is now being equipped with modern apparatus and, it is announced, will employ 75 to 100 men when completed and in full operation.

The Texas Trap Rock Co., San Antonio, Texas, has engaged Preston K. Yates of New York City to redesign their plant to double the present capacity. The entire output of the plant is a trap rock and is the only deposit of trap rock in the state now being supplied for road and ballast use. The supply is unlimited in amount and in view of the great number of miles of roads to be built in Texas it will tax the company to take out the amount necessary to supply the market. Work on the construction has already commenced and will be completed in the early part of the next year.

Retail Dealers

The Madison Concrete Products Co., Madison, Wis., manufacturers of mako products, cement blocks, hollow concrete posts, etc., has increased its capital from $15,000 to $25,000.

The Builders Supply Co., Greenville, S. C., has been incorporated for $50,000 to deal in building material. The incorporators are J. C. Cunningham and R. B. Dodson, both of Greer, South Carolina.

The Richmond-Horton Milling Co., Shawano, Wis., has been incorporated with a capital of $20,000 to deal in lime, cement and fertilizers. The incorporators are H. F. Richmond, H. B. Richmond and Ira J. Weeks.

Sand and Gravel

The Allen Gravel Co., Memphis, Tenn., is busily engaged in capacity production at its several pits near that city.

The Beloit Sand and Gravel Co., Beloit, Wis., has just completed the erection of additional equipment and storage bins that will increase the plant's capacity from 20 to 35 cars per day.

The Batesville Gravel Co., Batesville, Miss., has increased its capital for the purpose of enlarging its plant. Business is very good and with the added equipment the company will start next year's business with a rush.

The Missouri Portland Cement Co., St. Louis, which, besides manufacturing cement, also engages in a large river trade in sand and gravel, reports that this year has been a very successful one for river business. This is due to the general road work throughout its territory.

The Greenville Sand and Gravel Co., main offices at Greenville, Ohio, reports that its plants at Arkansas City, Ark., and the one in Mississippi State are doing an unusually large amount of business, but are suffering from the general shortage of cars throughout that district.

The Boston Sand and Gravel Co., Boston, Mass., is reconstructing its plant at Scituate, Mass., to eliminate the large shaker screens now in use. This plant was described in detail in ROCK PRODUCTS of April 12, 1919. It is expected to greatly increase the capacity of the plant by a new screen layout.

The Toledo Pulp Plaster Co., Toledo, Ohio, now has one of the largest shipping docks on the Great Lakes for handling sand. The company recently took over the old D. & C. dock at the foot of Magnolia Street. At this site the company now has a four-track railroad service paralleling the Pennsylvania lines, which give a 50-car daily shipping capacity.. A new 1,000-foot dock has been built. The depth of the yard is 150 feet. The old steamship ticket office, which is well known to Toledo excursionists, has been moved to the foot of Olive Street and remodeled for a dock office.

Gypsum Products

The Manitoba Gypsum Co., Winnipeg, Man., has made a start on the construction of 25 houses near their mill for their employees. These houses are being built largely of stucco, but the style is varied to suit the individual taste of the prospective tenant. The cost varies from $3,000 to $4,000. Mr. Armstrong, vice-president of the company, expects a big demand for the houses.

OBITUARY

Capt. Arthur Warender, 64, employed for the last 35 years by the Milwaukee Sand and Gravel Co., died Saturday at Emergency Hospital a few hours after a stroke of apoplexy, while his scow, the Ellen, was loading sand off shore, South Milwaukee.

Harry P. Johnson, President of the Memphis, Tenn., branch of the Missouri Portland Cement Co., St. Louis, Mo., died at his home in Memphis. Mr. Johnson, who was 55 years old, had been active throughout his lifetime in sand and gravel production and the manufacturing of cement.

Personals

C. E. Loudenslager, who has been appointed District Sales Manager of New York territory in connection with the Road Building Machinery Department of the Beaumont Mfg. Co., Philadelphia, Pa., is located at Room 1358, 50 Church Street, New York City.

Capt. P. H. Brigham, 130th Engineers, U. S. A., recently returned from France after 19 months' foreign service, has received his discharge from the army and has entered the service of the Paving Department of the Lakewood Engineering Co., Cleveland, as field engineer for New York, New Jersey and New England. Before Capt. Brigham entered the army in May, 1917, he was employed as assistant engineer with the New York State Highway Department, with headquarters at Binghamton, N. Y.